Overset Isosurfaces

Justin Kauffman, advised by Jonathan Pitt

Solution of a steady three-dimensional convection-diffusion problem with two overset meshes. The solution was obtained through a coupled overset and hybridizable discontinuous Galerkin (HDG) algorithm. Volume rendering shows the overset region. The isosurfaces provide definition for the internal structure of the three diverging sources for this solution.
Dental cement for your squid
Abdon Pena-Francesch, advised by Melik C. Demirel

SEM image of columnar epithelial cells inside the suckers of a Loligo pealei squid. These cells hold ringed teeth inside the suction cups along the arms and tentacles, which are used for prey capture.
A vector plot of velocity in a flow field, apparently showing vorticity due to improper input parameters in a particle image velocimetry cross-correlation algorithm. The algorithm calculates velocity - the vector potential of vorticity - from measured displacement fields.
Pine tree leaves like silver crystal on silicon wafer

Huihun Jung, advised by Prof. Melik Demirel

SEM image of silver particle coated silicon wafer. In the experiments of metal-assisted chemical etching (MACE), after silver particle coating on top of cleaned silicon wafer with AgNO₃, pine tree leaves like crystals were found.
The Butterfly Effect

Sema Erten, advised by Dr. Akhlesh Lakhtakia

The wing of the Chorinea Sylphina butterfly viewed through an optical microscope with 10X magnification. The red color has a pigmentary origin. Coherent scattering and diffraction from every scale’s network of parallel ridges are responsible for blue iridescence and shimmer.
Laser Assisted Cold Spray combines the benefits of cold spray with laser heating. The heating laser follows the spray path and softens the depositing powder.
3D Bioprinted Scaffold

Kazim Kerim Moncal, advised by Ibrahim Tarik Ozbolat

Figure 1. 3D bioprinted collagen scaffold mixed with bone marrow mesenchymal stem cells (shown red) image taken using second harmonic generation microscopy by Thomas Abraham in Penn State Milton S. Hershey Medical Center.