Preliminary results obtained for the mechanical response of fiber-filled polymers processed in a commercial FDM system

- Parts produced on a MakerBot Replicator 2
- Samples made to ASTM 638
  - Polylactic Acid (PLA) (filament from MakerBot Industries)
  - PLA with 15% carbon fiber (CF-PLA) (filament from Protoplant INC)
- Test sample made with beads at 0°, 90°, 45°, 90°/0° and 45° (5 samples each)
- All samples were made with 17 0.23 mm thick layers with 100% fill at 225°C nozzle temp

Results show that simply adding carbon fiber to FDM filament may not yield improved mechanical performance as expected. Given that these are preliminary results, we have yet to evaluate the role of filament processing, voids, inter-tool path adhesion, fiber orientation, fiber length distribution, base material properties, etc., on test sample behavior. Additional work is needed to understand the relationship between fiber reinforcement and mechanical properties of these materials.