

Build Your Own 3D Printer Workshop

Level I - Assembly and Operation of the flexMendel 3D Printer

3-Day Workshop

The Build Your Own 3D Printer Workshop is designed to present the fundamental skills of learning how to build your own 3D printer based on the open source 3D printer platform. Participants will gain a much deeper understanding of how 3D printing technology works and be better prepared to integrate this technology into a high demand environment such as the classroom. Not only will instructors learn how to build their own 3D printer, but through this experience they will gain valuable knowledge on how to increase production while minimizing ongoing material costs. This helps to maximize the learning opportunities for the students while minimizing the economic footprint on the educational institution. Instructors will also be encouraged to join online 3D printing communities to provide continued engagement in the evolving trends of 3D printing technology.

Day 1 - 3D Printer Sub-Assemblies

- Overview and expectations
- Introduction to 3D printing
- flexMendel design theory
- Sub-assemblies for flexMendel
 - Reel holder
 - Various XYZ components
 - XYZ limit switches
 - Electronics tray
- 3D printer firmware instruction
 - Introduction to the Arduino IDE
 - Define coordinate system
 - Mechanical setup configuration
 - Thermistor settings
 - Motion/accuracy calculations
 - Flashing the firmware onto the Arduino
- Building the “Low-Mass Extruder”
 - Hotend assembly
 - Extruder assembly

Day 2 - 3D Printer Assembly

- Mechanical assembly
 - Aluminum frame
 - Y-carriage, motor, idler
 - Z-stage, guides, motors
 - X-carriage, motor, idler
 - Install “Low-Mass Extruder”
- Electrical assembly
 - AC/DC power supply
 - Stepper motors
 - XYZ limit switches
 - LCD Smart Controller and AC switch
 - LED lighting system
 - Heated bed/SS relay
 - AC power cord
- Initial calibrations/bed leveling
- Mechanical systems testing
 - Binding test
 - Heating/cooling element test
- First Print! - Razor Scraper

Day 3 - 3D Printer Operation

- 3D printer operational procedures
- Bedplate leveling techniques
- Slic3r - G-Code Generator
 - Default config file
 - Basic print settings
 - G-Code export process
 - Advanced print settings
- Open source 3D printing
 - Thingiverse
 - NetFABB Basic
- Limitations of a 3D printer
 - Design intent
 - Part feature optimization
- Routine maintenance activities
- Online resources available for additional background and information
 - RepRap Community
 - Autodesk 123D apps
- Review of materials presented
 - Question and answer session