

# Rotary 3D Printer

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## Project Statement

To design and fabricate a rotating cylinder 3D printer that allows manufacturing of complex cylindrical structures.

## Motivations

- Print strong structures tangential to a cylindrical print surface
- Manufacture cylindrical structures with novel open lattice walls
- Enhance knowledge of motor control and 3D printing technology

## Design and Manufacturing

### PLA Extruder 1

- 1.75mm PLA Filament, Direct drive hot end and 0.4mm nozzle

### X-Axis Carriage 2

- Carriage and extruder driven by timing belt along x-axis

### Spindle Assembly and Print Surface 3

- 75mm OD x 150mm L Delrin print surface
- Spring-loaded, adjustable bed leveling support

### Z-Axis Table 4

- Twin lead screw driven z-axis

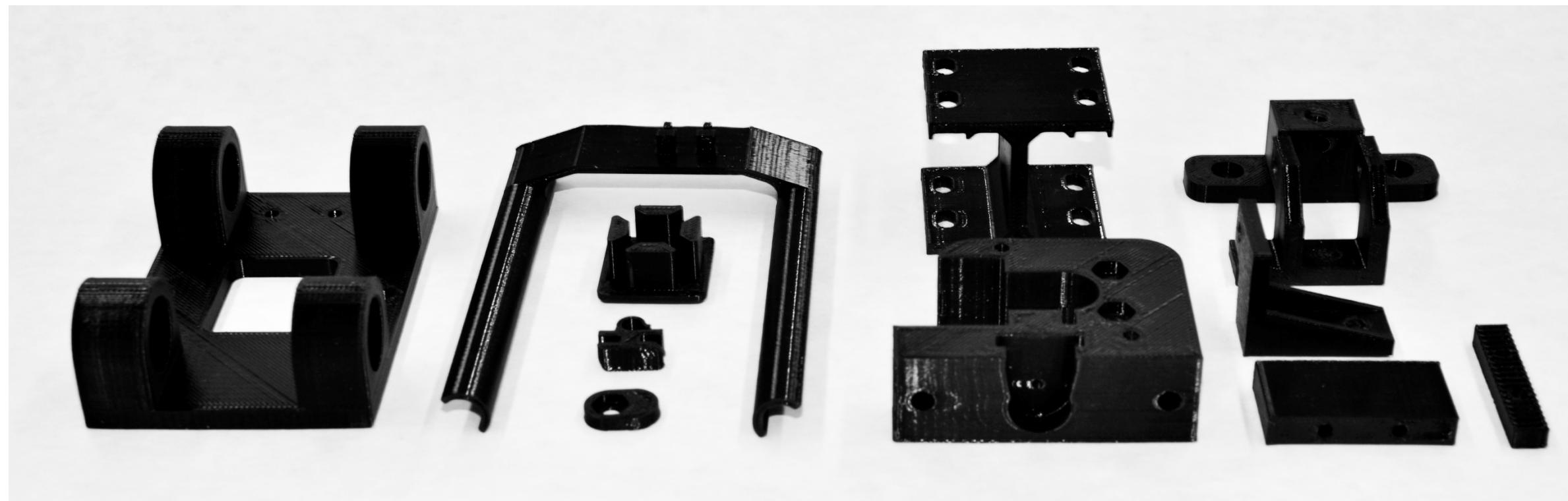


Figure 3. Prototype and final 3D printed parts.

### 3D Printed Parts

- Rapid prototyping allowed quick redesign and reprint of several 3D printed parts to improve strength and bending resistance

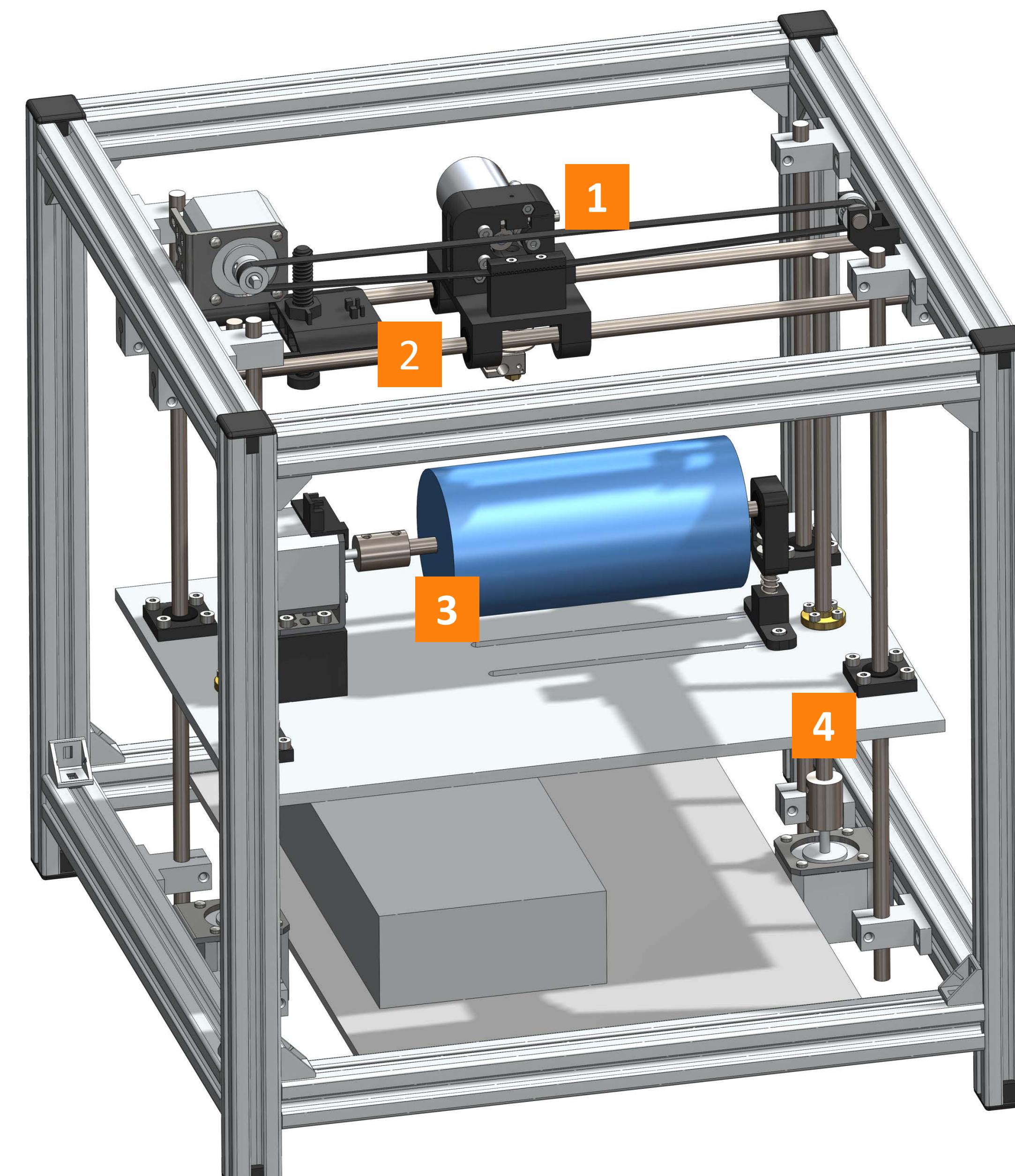


Figure 1. Solidworks model of rotary 3D printer.

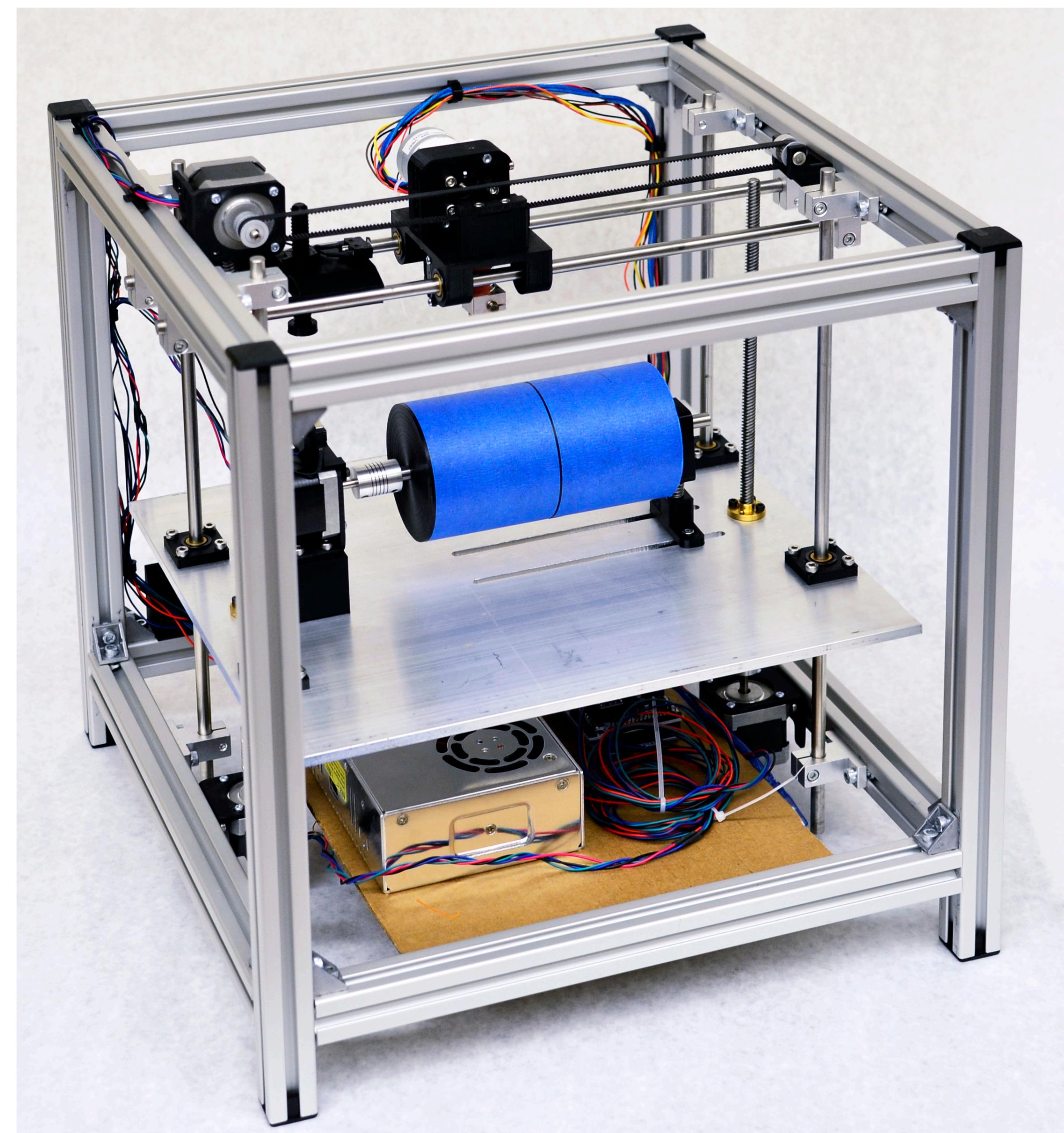


Figure 2. Full assembly of rotary 3D printer.

## Control System

- Arduino Mega and RepRap motor control board
- Marlin 3D print firmware and G-Code Interpreter

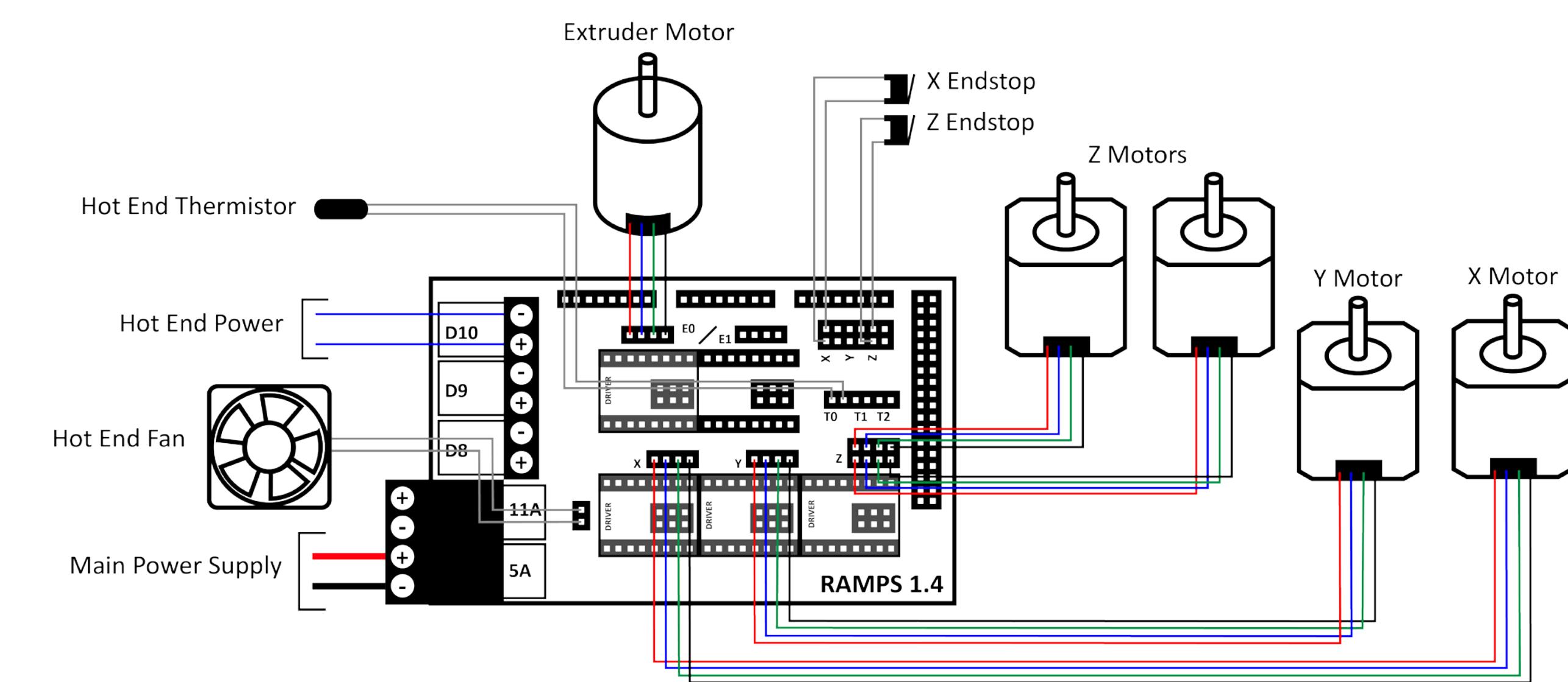


Figure 4. Wiring schematic for electronic components.

## Results

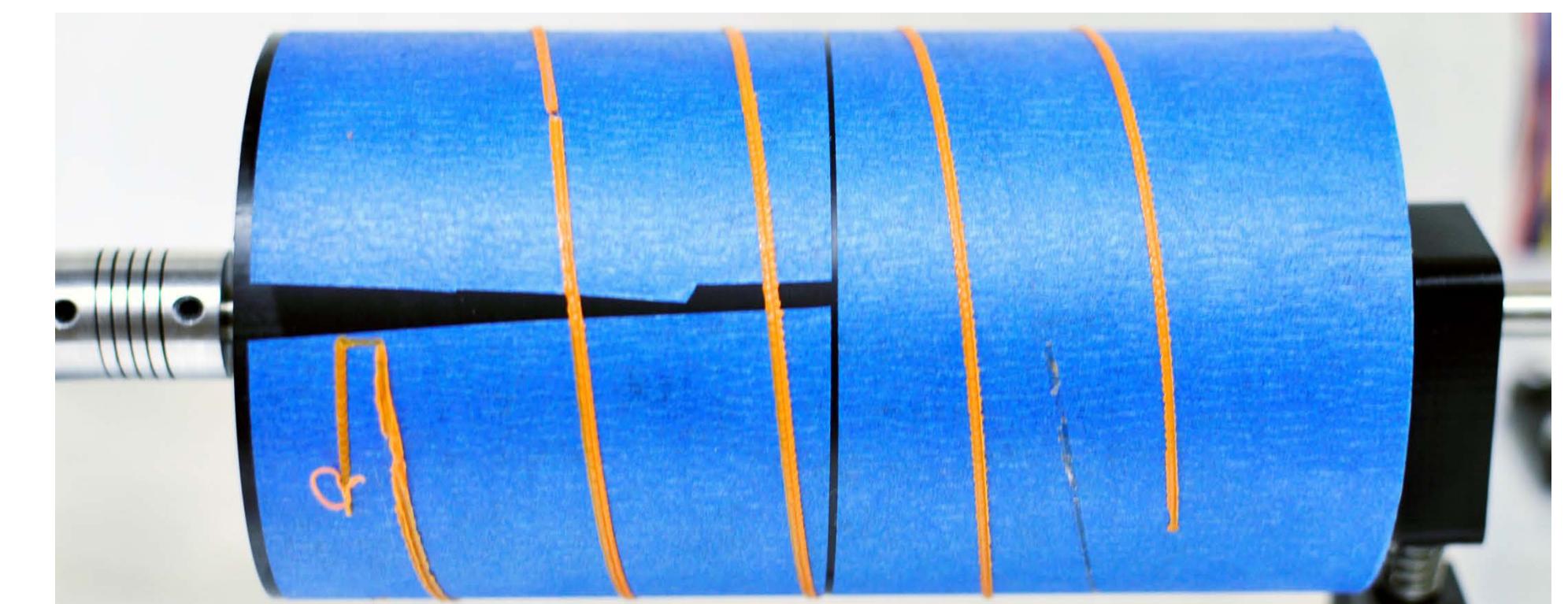


Figure 5. Spiral spring test program with multiple passes.

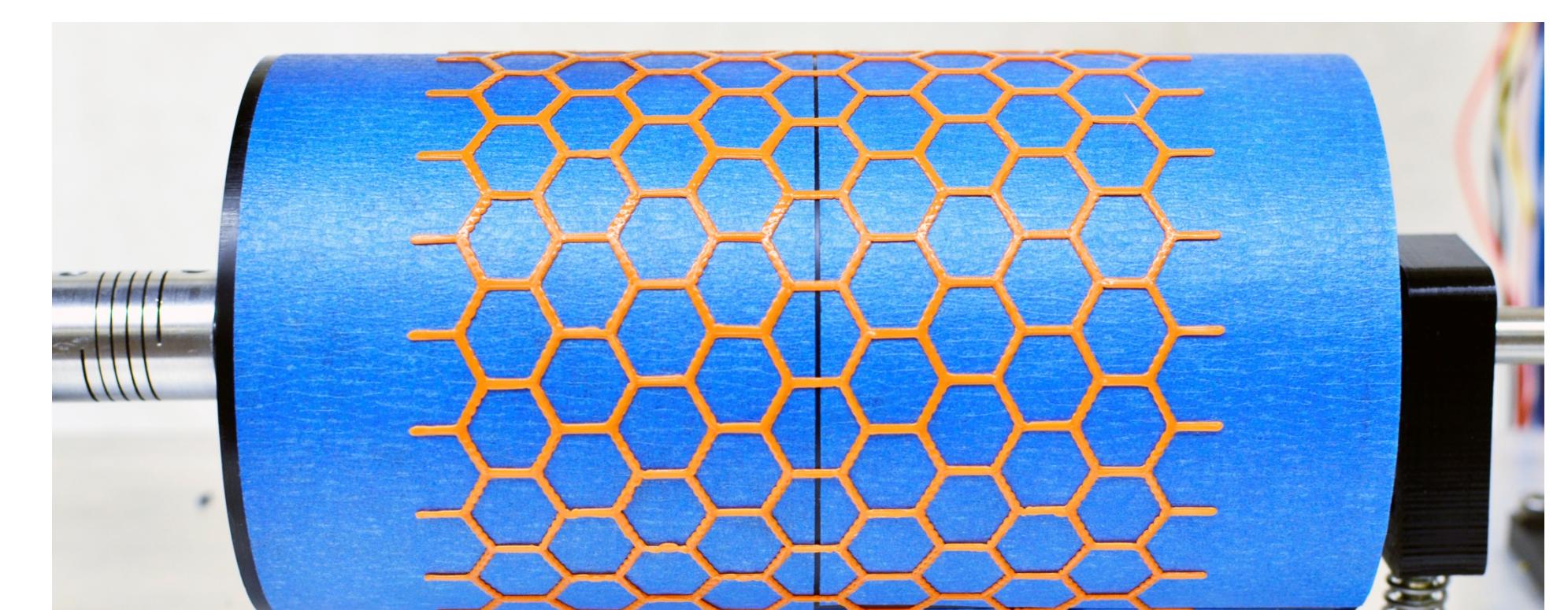


Figure 6. Complex hexagonal structure patterned around cylinder.

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