3D Printing for the Undergraduate Lab

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The Potential...
We aren’t there yet.
For reasonably-priced printers, we can currently:

- print small parts, slowly.
- print parts that don’t have significant overhangs.
- print with a handful of types of plastic.
- print one (or maybe two) materials at a time.
Materials Available

- Acrylonitrile Butadine Styrene (ABS): “Lego plastic” Requires high temperature, smells bad while hot, difficult to print consistently, but relatively strong.

- PolyLactic Acid (PLA): easier to work with, non-toxic, more brittle and sags at an inconveniently low temperature.

- Nylon, other plastics in development.

- Metals still in very early development.

- Chocolate?
Thermometer Holder

- Design: Google Sketchup (Free!)
- Exported to .stl format with a free Sketchup plugin
- Material: ABS (Better "shape memory", less brittle than PLA)
One complication:
“Grain”

The clip on the right works great, the one on the left failed immediately.
Another complication: Overhangs

45° is a 50/50 proposition.
My printer: a “Solidoodle”

- $500 — Donated to my department
- 15cm x 15cm x 15cm print area, enclosed
- “VW Beetle equivalent”

… and if I had the budget to buy one myself I’d consider a better one, if I knew for sure what was better!
Yes.

- Will 3D printers get better?
- Will they get cheaper?
- Are they a reasonable tool to purchase for a lab at this point in their development?
- Am I happy to answer any questions if you decide to add 3D printing to your lab-fab skills?

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