

## Open source accelerates 3D fabrications and 3D printings

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Justin Poelma wrote an article entitled "Rethinking digital manufacturing with polymers" (1). In the beginning of 3D printing sales, 3D printing companies sold only proprietary hardware and materials including plastic filament (2). These companies were following the path of traditional desktop printing companies that rake in large profits selling toner and ink (2). With the advent of open source RepRap 3D printers, dozens of open source 3D printer companies have been incubated (3). RepRapFirmware has been a platform for introducing innovation in 3D printer firmware (3). Desktop 3D printer market continues to grow while industrial 3D printers are down. The market is composed of 3D printers, materials, and services. Software toolchain (open source) is composed of CAD (Computer Aided Design) tool, CAM (Computer Aided Manufacturing) tool, and firmware for controlling electronics. Most popular 3D modeling & design software for 3D printing is Blender, open source software and very active in 3D printer communities. Open source plays a key role in 3D fabrications and 3D printings.

### References:

1. Justin Poelma et al., "Rethinking digital manufacturing with polymers," *Science*, 15 Dec 2017: Vol. 358, Issue 6369, pp. 1384-1385
2. Joshua Pearce, "The first open source 3D printer filament," 31 May 2017  
<https://opensource.com/article/17/5/open-source-3d-printing-filament>
3. Joris Peels, "Should Desktop 3D Printing Be Open Source or Closed Source?" Apr 18, 2017  
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