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| 3D Systems Z450          | 3D Printing                         | ![](image)      | 3d printing operates one layer at a time by spreading a layer of powder, and printing a binder in the cross-section of the part using an inkjet print head, along with color ink. Parts are then removed from the powder, and infiltrated with an acrylimide glue to give parts strength. | Plaster type material          | .004"           | 0.020"          | 8" x 10" x 8"  | None. Loose powder is easily removed. Trapped powder charged as solid material. | Fast   | $8/cubic inch   | n/a              | • Able to print in color, with mapped photos and text.  
  • Best suited for quick, initial models.  
  • Parts are not strong, can break if dropped.  
  • Lowest cost, quickest method of RP. |
| Stratasys Fortus 250mc   | Fused Deposition Modeling           | ![](image)      | FDM functions by extruding an ABS or PLA string through a heated nozzle, allowing plastic to flow and bond. A material and support nozzle extrude materials layer by layer, building a component by fusing the semi-molten plastic strings into a solid part. | White or colored ABS           | .007"           | .010"           | .013"         | 10" x 10" x 14" | Yes. Water-soluble, removed in cleaning tank. | Slow   | $8/cubic inch   | $8/cubic inch     | • Best used for solid, functional components.  
  • Can print in only one color.  
  • Direction of build influences strength of part. |
| Stratasys Connex 350     | Droplet Deposition Stereolithography | ![](image)      | DDS uses uses 8 print heads to exponge a photocurable resin and support, onto a build plate. These materials are then cured via a UV light to solidify the part. 2 Core material types can be combined during a single print, allowing up to 14 different digital materials to be included in a single part. | Rigid Opaque, Flexible rubber-like, High Strength ABS, Transparent, Polypropylene-like | 0.001"           | 0.003"           | 13.8" x 13.8" x 7.9" | Yes. Gel-like, removed via high pressure waterjet | Medium | $1.20-$1.40/gram  
  *direct quotes done in person* | $0.30/gram  
  *direct quotes done in person* | • Can print multiple materials in the same print.  
  • Highest resolution features only available without support material  
  • Highest resolution layers, resulting in best-finish and appearance. |
| 3D Systems Phenix PXS    | Direct Metal Laser Sintering        | ![](image)      | DMLS uses a focused laser beam to cure metal powder to a solid part through a melting process. Successive metal powder layers are then deposited on top of a solidified layer, allowing the laser to bond material to previously formed layers of metal. | Stainless Steel 17-4 PH  
  94 - 98% dense             | 0.001"           | 0.004"           | 3.9" x 3.9" x 3.1" | Yes. Support structure is metal - removal is done manually by requesting party. | Medium | $0.60-$0.65/gram  
  *direct quotes done in person* | $0.50-$0.60/gram  
  *direct quotes done in person* | • Highest strength parts - truly usable in high load and real-world applications.  
  • Support structure is firmly attached, and requires manual finishing. |
Rapid Prototyping Part Request Process:

1. Generate "STL" files of each individual part to be prototyped.
2. Contact the Rapid Prototyping Lab Manager (rp.lab@northwestern.edu) to schedule an initial meeting, and include the part files to be produced.
3. Meet with the RP lab manager or lab staff to review materials options, and choose a method of production.
4. Provide an account chart string to charge the build to. Quotes will be provided at your 1-on-1 meeting. Parts will not be built until a chart string is provided.
5. Provide the quantity of each part to be requested, and the materials / production method for each part.
6. Lab staff will build your part, and notify you once ready for pickup.