SPRING 2025

SOCIETY OF PLASTICS ENGINEERS

CADNEWS

RETEC 2025

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TECHNICAL ARTICLE

3D PRINTING: THE DISRUPTIVE TECHNOLOGY

RON BECK // AMERICHEM INC

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COLORING THE WORLD OF PLASTICS

CAD NEWS®

CHAIRMAN'S MESSAGE

Spring is eternal and soon upon us, and welcome to the 2025 Spring edition of CAD News!

Come in from the cold and that is an understatement! Let's do what we do best and welcome the beautiful colors of Spring. Spring is also election time for our CAD Board of Directors. Please make sure you visit our website and select the Elections Portal for voting instructions and candidate biographies.

On the note of board members, we have two long-time members who will leave the Board. Betty Puckerin of Ampacet Corp and Cheryl Treat of Sun Chemical. This personally saddens me because of the unconditional dedication and devotion both Betty and Cheryl have contributed to CAD over the years. Both have chaired various committees, as well as serving as Division Chair, and in addition to, were always there to help no matter how much they have burdened themselves with thankless performances. Their contributions are innumerable, and they will both be missed.

Although the KC Chiefs put up a gallant effort (I am sure the Eagle fans want to chime in) We will have our CAD Spring Board Meeting in Kansas City to not celebrate their victory but to drown in their sorrows. Come join us May 4-6 and let's share a few steaks, later that week. If you are interested in attending, please feel free to contact any Board member for details.

Plans have already started to Rock Cleveland again for our 63rd 2025 CAD RETEC which will be held at The Hotel Cleveland which is where he held RETEC 2019 but is now an Autograph Collection Hotel. This is an outstanding property that went through a 90 Million Dollar renovation since we were last there and we are looking forward to all its amenities

If you have an interest in presenting a paper, please contact Doreen Becker or Karen Carlson. See the Call for Papers page for contact information in this issue.

Sponsorships are now open and we have Silver, Gold, and Platinum opportunities so contact Scott Aumann (saumann@chromacolors.com) if interested in sponsoring.

I hope you find the information in the newsletter interesting. Thank you everyone and enjoy the wonderful colors of Spring!

GEORGE IANNUZZI
Color and Appearance Division Chair
george@koelcolours.com

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RETEC 2025

CALL FOR PAPERS

DEADLINE FOR ABSTRACTS
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spe

Transforming Black Plastic Recycling

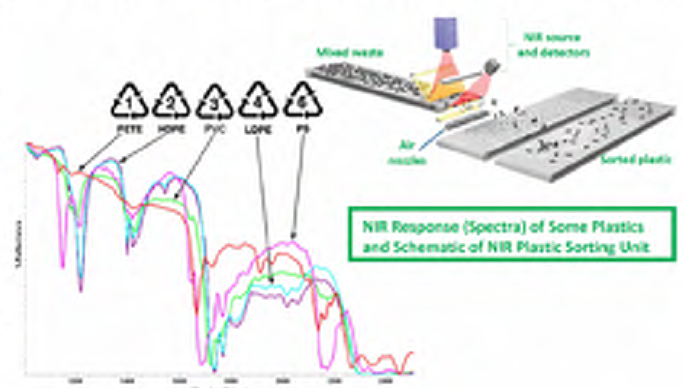
Black plastic recycling poses a significant challenge due to the widespread use of carbon black pigments, which interfere with Near-Infrared (NIR) sorting technologies.

At **Alfarben & Torrecid Group**, we proudly embody our motto ***"A Family & Green Company"*** and stand anchored in our commitment to sustainability and innovation. Our convictions lead to our 2019 development of the first solution to the challenge of non-detectable black items.

Reflecting the Light for Sorting Technologies

NIR sorting plays a crucial role in identifying and separating different types of plastics, thus enabling efficient recycling. However, carbon black absorbs NIR light, making black plastics invisible to sensors in automated recycling facilities.

Recycling becomes impossible, leading to contamination in recycling streams and causing more black plastics to end up in landfills and incineration facilities.



Alternative Pigments

To address the black plastic recycling issue, **Alfarben** is applying innovative solutions such as our RBLACK portfolio, which enables NIR sensors to detect black plastics. These pigments allow accurate sorting and recycling without compromising the appearance or performance of plastic products. Additionally, they are FDA-approved and non-magnetic, ensuring both safety and efficiency.

The RBLACK family offers the most neutral shades available, making it an ideal solution when both neutrality and detectability are essential. Furthermore, RBLACK can be mixed with organic materials, which allows us to further expand its capabilities.

Industry Collaboration and Regulation

Collaboration among industry stakeholders, including manufacturers, recyclers, and policymakers, is essential for driving the adoption of these solutions. Moreover, implementing standards and regulations that mandate the use of NIR-compatible pigments significantly enhance the recyclability of black plastics.

Addressing the black plastic recycling problem requires a multifaceted approach involving innovative materials, advanced technologies, and collaborative efforts. By adopting these solutions, the industry can improve recycling rates and reduce the environmental impact of plastic packaging and products.

Alfarben | TORRECID Group

INORGANIC PIGMENTS

Color and Appearance Division

SPE® COLOR & APPEARANCE

Society of Plastics Engineers Color and Appearance Division

Call for Board of Directors Candidates

2025 to 2028 Term

The Color & Appearance Division of the SPE will be conducting its annual Board of Directors elections April 2025.

SPE CAD Board of Directors
The election is open to current SPE members with CAD as their primary division. Time commitment would be for four meetings per year for 3 year terms. One of the meetings will correspond with RETEC where you will participate in CAD activities and initiatives. Members of the Board participate in the planning, organization and running of CAD activities including ANTEC programs, RETEC programs, Technical Programs, Scholarship Programs & Funding, as well as offering guidance and advice to other SPE members interested in coloring plastic resins.

To be listed as a candidate or have questions about becoming a candidate, please Email or call **Chair Elect Kimberly Williamson**. Please Email a picture of yourself, educational background, employment (current and prior), and why you wish to be a candidate to:

Kimberly Williamson
Email: kwilliamson@techmerpm.com
Phone: 865-425-2180

All candidates must be identified and have all their information to SPE CAD BOD by March 31st, 2025.

Visit SPECAD website for more information.

SPE COLOR AND APPEARANCE DIVISION MISSION STATEMENT

The Color and Appearance Division of SPE strives to educate, train, inform and provide professional interaction opportunities to the global community involved in visual performance and aesthetics of plastics.

INVITATION TO ATTEND CAD BOARD MEETING

The Color and Appearance Division (CAD) holds 4 Board of Directors (BOD) meetings each year, either in person or virtually. Any CAD members in good standing with in SPE and has Color and Appearance as their selected division are welcomed to attend these meetings. If interested in attending these meetings, please contact the current CAD Chairperson or any BOD for more information.

TECHNICAL Q&A

Q: Are there test methods for heat buildup or total solar reflectance?

A: Our education committee reports: Yes, a good start is to review the ASTM methods listed below.

- ASTM D4803 – Standard test method for predicting Heat Buildup in PVC building products.
- ASTM D7990-15 – Standard test method using Reflectance Spectra to produce an Index of temperature rise in polymeric siding.
- ASTM E903 – Standard test method for Solar Absorbance, Reflectance, and Transmittance of materials using integrating spheres.
- ASTM C1549 – Standard test method for determination of Solar Reflectance Near Ambient Temperature using portable solar reflectometer.

We hope this gets you headed in the right direction and thanks for the question!

TECHNICAL ARTICLE INTRODUCTION

BY SCOTT HEITZMAN

CADNEWS TECHNICAL CONTENT

The Technical Content portion of our summer addition of CADNEWS® includes a paper from 2021. 3D Printing: The Disruptive Technology. The paper by Ron Beck from Americhem.. It is a great read or reread!

CADNEWS COLOR NOTES

Welcome to CADNEWS® Color Notes. Do you have a question regarding color and effects? Don't miss your opportunity to anonymously ask our team of experts. We can help create discussion as well as provide answers. Color, appearance, color measurements, and colorants in general are all in our scope. Use the link below to submit your questions. Our SPECAD Color Notes committee will provide a response in the upcoming CADNEWS®.

HTTP://SPECAD.ORG/COLOR-QUESTIONS-FOR-CAD/

3D Printing: The Disruptive Technology

Ron Beck, Americhem Inc.

3D Printing: The Disruptive Technology

On the TV series *Star Trek: The Next Generation*, Captain Picard often said to his ship's computer, "Tea, Earl Grey, Hot", and our imaginations opened to the possibility of making digital 3D objects. The term "replicator" was used to describe a 23rd century "food synthesizer" where food could be verbally requested and materialized instantly. 3D printing has made a reality of instantly creating not only food, but artificial limbs, rocket engines, and buildings, as well as faxing 3D objects and sending digital information to the International Space Station to print their own tools. It's a Maker's revolution!

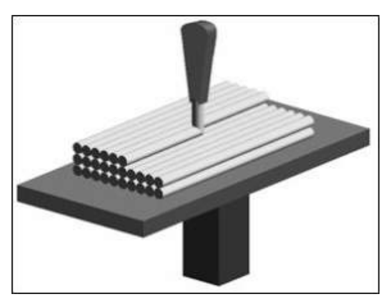
This revolution doesn't involve politics or governments, but it upends the world as we know it by way of a disruptive technology. A disruptive technology is a technology that creates a new market and then disrupts an existing technology and eventually takes over the parts of the industry that are unable to adapt to the competition. This has happened with the photography, publishing, music, and movie industries due to the digital industry. The same thing is happening to forming technologies, such as molding and extrusion, through the disruptive 3D printing technology, also known as additive manufacturing.

Limitations in current processes

Some common ways to produce objects are by injection molding, blow molding, extrusion, and vacuum forming, all of which have their limitations. For example, these production methods lack the ability to make complex objects, like a three dimensional lattice structure. To create complex objects, one would need to create individual parts and then assemble them together. Molding and extrusion also have the issues of high initial investment and tooling costs. Other limitations include the high cost for short runs of personalized objects and prototyping.

What is 3D printing?

The ASTM International Committee F42 on Additive Manufacturing Technologies defines "additive manufacturing" as the process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to "subtractive manufacturing" methods where a piece of raw material is cut into a desired final shape and size by a controlled material-removal process. The essence of 3D printing is using software that can "slice" a digital 3D image into a stack of 2D layers, and then use a digitally controlled apparatus to build the object by depositing successive layers of material. Plastics, metals, cement, chocolate, and human cells are all materials used in the 3D printing process that are layered by extrusion, bonding, laser sintering, or thermosetting.



Additive Manufacturing

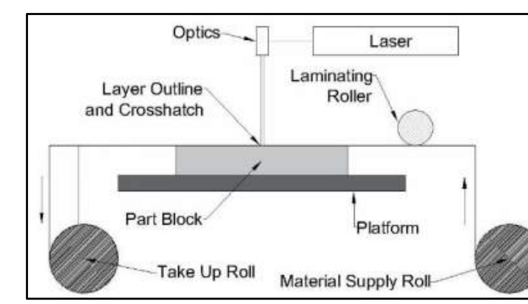
Getting the 3D process from ideation to realized production is a long and complicated process. It involves:

- Digital Modeling – The creation of a 3D model can be done with 3D modeling software or a 3D scanner.
- Generation of a Digital File – The proper file format is usually a STL file. According to Microsoft, a new format has been developed called the 3MF specification that eliminates the problems associated with currently available file formats, such as dealing with color.
- Mesh Repairing – Many times there will be defects or holes in the digital object surfaces, especially with scanning, that need to be repaired by filling the holes to make the object "water tight."
- Slicing – The object needs to be digitally sliced to the required thickness that each layer has been specified. A common thickness for high resolution is 0.1 mm which makes each layer barely detectable by the human eye. After slicing, a set of command instructions called g-code are created.
- Connecting – Send the command instructions to the 3D printer.
- Printing – Using the command instructions, instruct the print head where to process the object in the XY direction and when to move the base for each layer in the Z direction.
- Finishing – Remove any unwanted material, such as loose powder, support material, rafts, etc.

Types of 3D printing

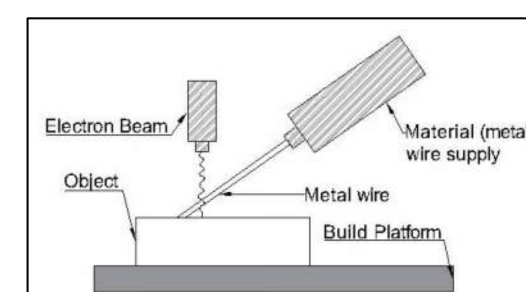
There are seven types of 3D printing methods as defined by ASTM F2792. These include sheet lamination, direct energy deposition, material jetting, binder jetting, powder bed fusion, vat photopolymerization, and material extrusion. 3D printers can run the gamut in price from industrial and professional printers that can cost as much as $500K, desktop printers that are under $5,000 and desktop printer kits that can be built for a few hundred dollars.

A **sheet lamination** printer builds objects by cutting with a laser or blade successive sheets of paper, metal foil or plastic and binding the layers together similar to making plywood. Sheet lamination, also known as laminated object manufacturing, was invented by Michael Feygin, the founder of Helisys, Inc. A 2D printing technique using a color ink-jet head can be used to color the edges of the cut paper to create objects in full color. Sheet lamination does not require support structures because the unused build material that surrounds the object will hold everything in place until the object is finished. This process is limited to solid objects. Sheet lamination is primarily used to make full color prototypes.



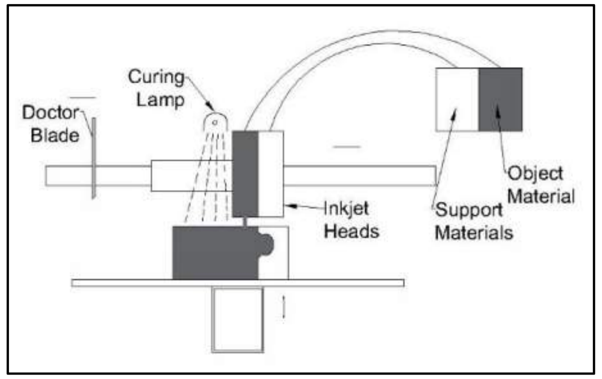
Sheet Lamination

The **directed energy deposition** (DED) process creates parts by using focused thermal energy to selectively fuse materials by melting as they are deposited on a substrate. In most cases, a laser is used with metal powder to create an object. A variety of metal materials can be printed using this technique, including copper, nickel, aluminum, stainless steel, cobalt, or titanium. Typical applications of directed energy deposition include repairing and maintaining structural parts.



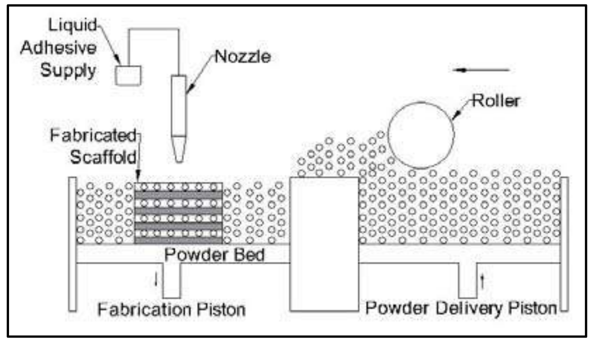
Directed Energy Deposition

Using a technique to thermoset polymers, **material jetting** creates objects by selectively depositing small droplets of build material using inkjet heads. The materials used are typically photopolymers or wax-like materials that are then cured by exposure to UV energy as the printing process takes place. There is a wide range of photopolymers available including compounds that simulate ABS, PP, PC and rubber. Material jetting systems often use multi-nozzle print heads to increase build speed and to print different materials simultaneously. There are typically two print heads: one is used to deposit material to build the object while the other can be used as scaffolding to support overhangs. The support material is typically a water soluble gel-like material that is removed later by using a water jet for incredible detail. There are select Stratasys PolyJet 3D Printers that are capable of fabricating "Digital Materials" [1]. These digital materials are composite materials with predetermined visual and mechanical properties that are made right in the 3D printer as it is printing. As many as 82 distinct material properties can be created in one build.



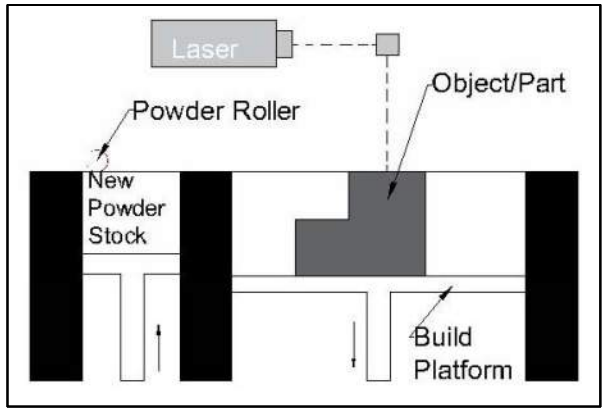
Material Jetting

Using a technique to fuse powder together, **binder jetting** uses a process of selectively depositing a liquid binding agent through inkjet print head nozzles to join a powdered material in a powder bed one layer (350 – 500 µm) at a time to form an object with fine detail. Because the finished object remains in the powder bed until it is complete, there is no need for support scaffolding. Once the object is complete, it will be removed from the powder bed and blown with compressed air to remove all the loose powder. An advantage of binder jetting is that the binder can be colored pixel by pixel, similar to a 2D print, to generate the object in full color. Another advantage is the objects can be built quicker and at a lower cost than most of the alternative 3D printing methods.



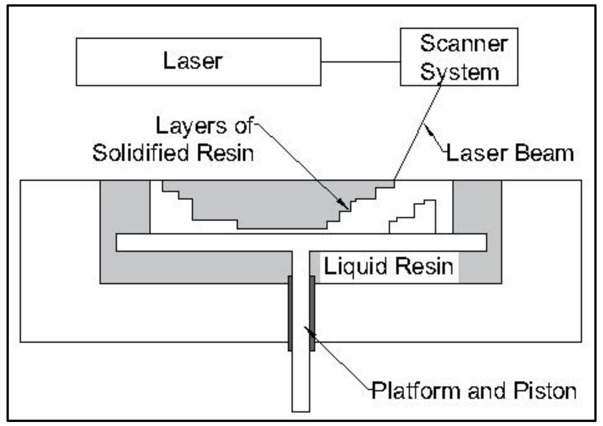
Binder Jetting

Another powder bonding technique, called **powder bed fusion** invented by Carl Deckard, builds parts by using thermal energy to selectively fuse regions of a powder bed for each layer (45 – 100 µm) created. Powdered polymers, such as polyamide, many metals, ceramics, sand, and wax, can be sintered or partially melted together by using a laser or an electron beam to create the object. NASA 3D printed the first full-scale copper rocket engine part having 8255 layers of copper powder that took 10 days and 18 hours to print using the powder bed fusion process [2]. As with most powder-based technologies, powder bed fusion produces objects that do not require the addition of support structures.



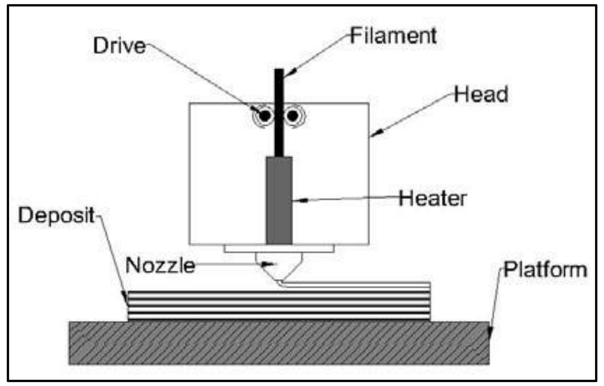
Powder Bed Fusion

Using another photopolymerization process, **vat photopolymerization** creates parts by using an UV laser to selectively cure layers of material in a vat of liquid photopolymer. These photopolymers can be different colors, creating an object in one solid color. In vat photopolymerization, additional structures need to be added to support overhangs. Objects often need to be cured further in an UV oven. Objects produced using vat photopolymerization are very precise, with each layer being 1 – 70 µm. Vat photopolymerization was the first 3D printing technique created.



Vat Photopolymerization

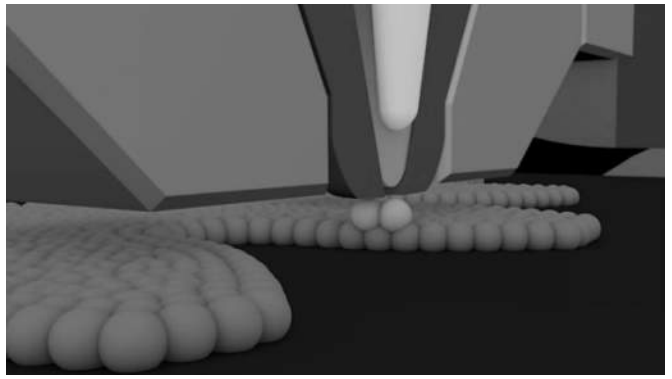
Using a miniature extruder, **material extrusion** selectively extrudes material through a nozzle or orifice roughly 0.6 mm in diameter to build each layer (100 – 700 µm) to form an object. Typically a 1.75 to 3.0 mm filament of thermoplastic coiled onto a spool is metered through the orifice as it is melted. In addition to ABS and PLA, which are the most common materials used, PLA/PHA, PVA (water soluble), PA, PMMA, HDPE, PP, PC, PC/ABS, HIPS, PEI, and PFA are also used. S. Scott Crump first developed material extrusion in the 1980s, calling it Fused Deposition Modeling, or FDM. Crump was an entrepreneur with a serious tinkering hobby. He decided to load his glue gun with a mixture of candle wax and polyethylene to build a toy frog for his daughter from scratch. Using the glue gun, he built the frog layer by layer, inventing a 3D printing method. This method represents the largest installed base of additive manufacturing machines. The FDM process was commercialized in 1990 by Stratasys. Since many of the original patents have expired, there has been an explosion of personal desktop printers.



Material Extrusion

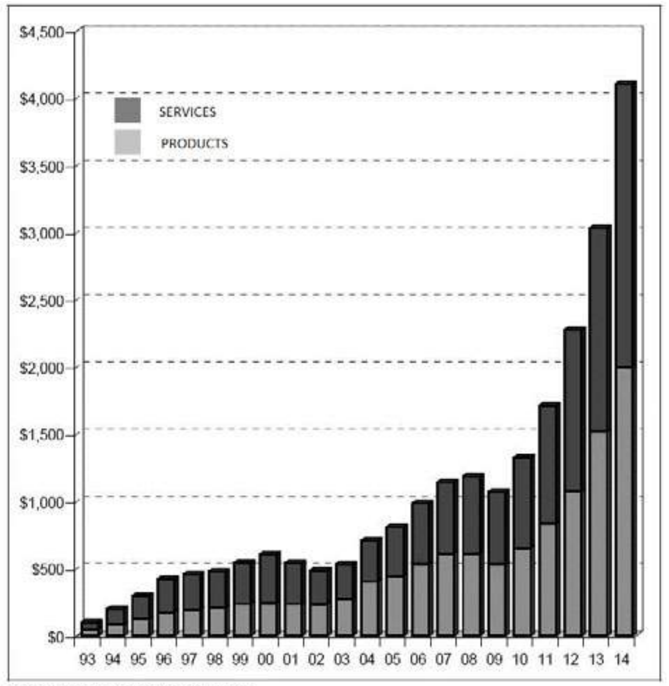
A variation of material extrusion that eliminates the plastic filament, called robocasting, uses viscous liquids that can be loaded into a syringe and injected onto the build surface one layer (200 – 400 µm) at a time. Raw materials that are extruded by this method include ceramics, composites, metal filled clays, concrete, food, and living cells suspended in a hydrogel.

Arburg, a German manufacturer of injection molding machines, developed a printer that is a variation of the material extrusion process called Freeformer [3]. Instead of extruding a continuous bead of thermoplastic, the Freeformer deposits small droplets of molten polymer. An advantage of the Freeformer is that it uses pelleted materials instead of a filament. On May 27, 2015 Arburg was awarded the Plast Platinum Award medal in the plastics processing machines and systems category at the Plastpol tradeshow in Kielce, Poland.


Arburg Freeformer

3D printing market
Charles Hull, founder of 3D Systems, Inc., invented vat photopolymerization in 1984 and was awarded his patent in 1986. When 3D systems commercialized stereolithography in 1988, it was considered the birth of additive manufacturing. Hull's original patent expired in 2006. 3D Systems constantly strengthens their patent platform and is continually in court defending their technology. The original U.S. patent for material extrusion, called Fused Deposition Modeling, was filed in 1989 and issued to S. Scott Crump in 1992. Crump quickly commercialized his invention and became the co-founder of Stratasys. His patent expired in 2012, and the market for 3D technology exploded, especially in consumer desktop printers. Carl Deckard's patent for powder bed fusion expired at the beginning of 2014, and some low-cost Kickstarter printers are starting to become available. The RepRap Project was the first of the low-cost 3D printers, setting in motion the open-source maker's revolution. The RepRap Project was founded in 2005 by Dr. Adrian Bowyer, a Senior Lecturer in mechanical engineering at the University of Bath in the United Kingdom.

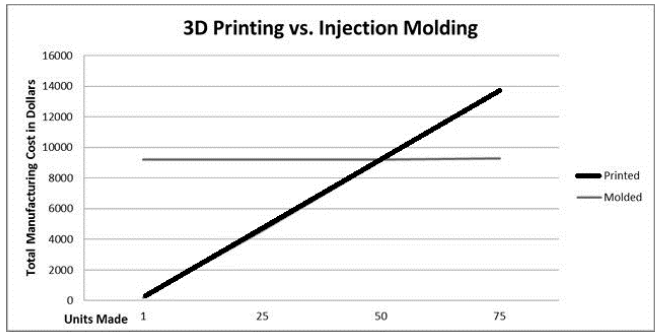
The additive manufacturing industry continues to explode with exponential growth. All additive manufacturing products and services worldwide grew 35.2% (CAGR) to $4.103 billion [4]. 3D printing services are mostly comprised of companies that only print objects. These companies allow anybody to convert their digital designs into physical objects, like concept models, prototypes, final parts, molds or tooling. Shapeways [5] is the leading 3D printing service in the world with more than 60,000 objects uploaded for printing every month. Pricing is usually calculated by the amount of material required to make the print. In 2014, an estimated $640 million was spent on materials for all additive manufacturing systems, including low-cost desktop machines and high-end systems. These estimates include sales of liquid resins, powders, pellets, filaments, sheet materials, and all other material types used for additive manufacturing [6].



Source: Wohlers Associates, Inc.

AM Products and Services Worldwide

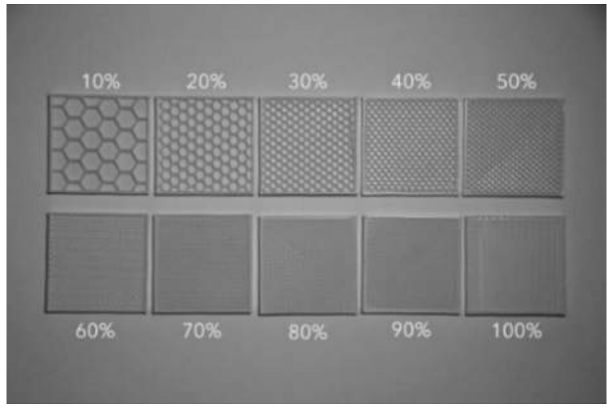
Advantages in 3D printing over molding
One of the biggest advantages of 3D printing is the ability to produce custom small lot parts at a lower cost than molding. The breakeven threshold for 3D printed parts is about 50 parts. This number continues to rise due to printing efficiencies, increased speeds, and the use of a battery of 3D printers called 3D print farms.
Limitations in



Breakeven Threshold

The most common application in 3D printing is prototyping. Thanks to advances in printer resolution, higher-definition coloration, and broader use of materials like elastomers, customers can more easily envision their final products and innovate without fear of hefty up-front investments. A special example of prototyping is to 3D print an injection molding tool and create a short run of parts for testing purposes before spending thousands of dollars to build the tool out of steel, only to find out that the molded parts do not preform as intended. 3D printed design molds cost about $1000 and test injected molder parts in less than 24 hours, whereas the conventional CNC process takes eight weeks and costs $40K to manufacture the molding tool in metal. The faster and cheaper 3D method can greatly accelerate the product-development cycle.

New manufacturing strategies, structures, and shapes



3D printed objects can be designed with a variety of infill densities and patterns inside the object. This method gives the object more durability and higher structural integrity while reducing weight. Traditional manufacturing methods rely on molds and cutting technologies to produce a finite number of shapes and structures, with more complex hollow structures having to be created from several parts and assembled together. A 3D printer's nozzle can build an infinite number of complex objects. An example of this is in conformal water lines. Conformal water lines can address the limitations of traditional machining where more creative water channels can be designed resulting in better access to hard-to-reach areas, higher energy efficiency, and significant cycle-time reductions.

Limitless scale and fully assembled
Another advantage of 3D printing is that it is limitless in scale. Objects can be made on a nanoscale basis and as large as buildings. This range continues to expand with new technologies constantly being created. A team from the Vienna University of Technology demonstrated the accuracy of their 3D printing equipment by creating a nano-scale model of Vienna's St Stephen's Cathedral with a resolution of 100 nm [7]. The design company WinSun Design Engineering Co. has set the record this year by constructing ten 3D printed five-story houses. Each was 1,100 square meters, and they were printed in under twenty-four hours and included internal and external decoration details [8]. Additionally, objects can be made fully assembled. Complex structures can be designed into an object that would normally have been "stick built." There is a well-known video from the National Geographic Channel [9] where Z-Corp prints a fully working crescent wrench. A new popular science is called "4D printing," or self-assembly technology, [10] where memory is built into the 3D printed flat object. This is done by printing a 3D object and then applying a stimulus, such as heat, electricity, or water to the printed object to make it fold into its proper form.

Customization and personalization
The overwhelming popularity of selfies in the general public make it evident that the trend toward customization and personalization will continue. Currently at Disney World, you can do the D-Tech Me Experience and get a 3D printed 7" full-color figure of yourself as a Star Wars Stormtrooper or Disney Princess for the low price of $99 [11]. The biggest area for customization and personalization is in the medical industry, where anything from hearing aids, dental crowns, and bones to kidney tissue [12] can be 3D printed as custom replacement parts.

Sustainability
Additive manufacturing can also promote sustainability with:

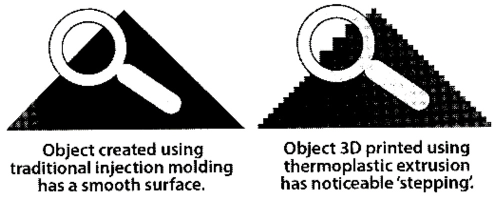
- JIT manufacturing
- Nimble process optimization through efficient prototyping
- Producing objects local to the point of use and reducing transportation costs
- Virtually eliminating the need for packaging
- Using local materials

- Generating very little waste
- Reduction of raw material consumption
- Recycling PLA
- Reduced inventories
- Creating simplified and efficient supply chains
- Optimizing product efficiency
- Producing lighter weight objects
- Reducing the lifecycle burden.

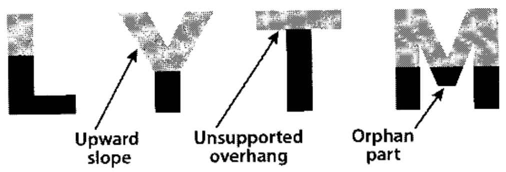
The best example of reduced transportation costs is when NASA sent a digital ratchet wrench file to a 3D printer aboard the International Space Station [13] for a special situation. Even though energy consumption is currently about the same as mass manufacturing, the on-going advancement in digital innovation virtually guranatees future imporvements in the 3D printing process.

Limitations and Freedoms of Engineering in 3D

There are some limitations to 3D printing. Stripe marks are currently a dead giveaway that an object has been 3D printed. The best industrial printers can currently extrude plastic objects in layers that are about 0.1 mm thin, and can also achieve an accuracy on their other two axes of about 0.1 mm. It is generally accepted that an unaided human eye cannot discern steps of less than 0.1 mm, although even when such a level of detail is achieved an object's surface is likely to feel somewhat rough [14]. New, high-resolution printing, however, may soon make those telltale stripes a thing of the past. Another shortcoming is printing speed. When a material extruder is pumping out a 0.1 mm strand through a print head moving at 1,800 mm/sec, it can take many hours to print even a small object.



Currently an object made with ABS plastic filament, which allows engineers to formulate fully functional parts, will only have up to 75% of the strength of an actual molded part. The industrial and professional printers have heated beds and build chambers in order to improve the z direction layer-to-layer adhesion and get better print bed adhesion to prevent part warping. Other limitations include part strength, limited printable materials, problematic melting of materials, and printers' inability to use conventional materials instead of high-cost designed materials. There can also be significant post processing, such as polishing, scaffolding removal, void filling, etc., as well as a lack of testing protocols for 3D printed parts. Another final and major issue to be dealt with is the support of any overhanging or 'orphan' object parts during printing [15].



Some of the biggest gaps in this technology are the lack of materials, processing, and testing standards. Understanding the basic structure-property relationships of polymers and their interaction with 3D printers is a must. A better understanding of RM material properties (mechanical, Z-direction tenacity, thermal, electrical, color, magnetic, aesthetic, toxicity) as it relates to 3D printing is essential to move the technology forward, as are improvements in printing quality at affordable prices.

Engineers can now dream in 3D without having the restrictions of conventional processes. It won't be long before an engineer's wildest innovations will be just one digital file away from realization. MakerBot Industries has promoted giving elementary schools 3D printers to expose students to the possibilities, so the next generation of engineers will not know the limits of what conventional manufacturing methods could produce. Additive manufacturing gives the engineer the freedom to make a highly customized object with a light-weight designed internal structure. Designs could have highly complex cooling channels built directly into the object, or materials with a continuous gradient of hardness could be instantly integrated into the object. Designing objects with a gradient of materials, integrating 4D self-assembly, designing total 3D work stations that combine 3D printing with robotics to add other components, 3D printing electrical circuits: these are all dreams an engineer could bring into reality with the freedom of 3D printing. Customization and personalization are current trends that are unlikely to disappear anytime soon. The medical industry, in particular, has always moved toward customization and amplifies the trend with dental implants and hearing aids made by 3D printing.

Conclusion

These are very exciting times to live in when a digital object can be transmitted to the space station and a ratchet wench could be printed for a specific repair instead of having an inventory of all the possible tools required to cover every situation. The thought of a prosthetic hand or a house to someone of low income coming from a printer is truly revolutionary. All that needs to be done to make this dream a reality is opening engineers' minds to new ways of approaching design.

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11. Jedi Knight and TIE-fighter Pilot D-Tech Me Figures Premiere at Star Wars Weekends Starting May 15, 2015 – http://disneyparks.disney.go.com/blog/2015/03/jedi-knight-and-tie-fighter-pilot-d-tech-me-figures-premiere-at-star-wars-weekends-starting-may-15-2015/
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SOCIETY OF PLASTICS ENGINEERS
COLOR & APPEARANCE DIVISION
ENDOWMENT SCHOLARSHIP PROGRAM
2025 - 2026 SCHOOL YEAR

The Endowment Scholarship Program offered by the Color & Appearance Division of the Society of Plastics Engineers awards multiple scholarships each year to students who have demonstrated or expressed an interest in the coloring of plastics industry. The students must be majoring in or taking courses that would be beneficial to a career in this industry. This would include, but is not limited to, plastics engineering, polymer science, coloring of plastics, chemistry, physics, chemical engineering, mechanical engineering, industrial design and industrial engineering. All applicants must be in good standing with their colleges. Financial need is considered for most scholarships.

Undergraduate and graduate scholarships have ranged up to $4,000 annually. Scholarships are awarded for one year only, but applicants may apply for a re-award for each year they are enrolled in school.

Scholarship Eligibility
1. Applicants for these scholarships must be full-time undergraduate students in either a four-year college or a two-year technical program or enrolled in a graduate program.
2. All applicants must be graduates of public or private high schools.

Scholarship Criteria
1. Applicants must have a demonstrated or expressed interest in the coloring of plastics industry.
2. Applicants must be majoring in or taking courses that would be beneficial to a career in the coloring of plastics industry.
3. An applicant must be in good academic standing with his or her school.
4. Preference is given to student members of SPE and also to students who have a parent(s) as a member of the Color & Appearance Division of the SPE.
5. Financial need of an applicant will be considered for most scholarships.

Application Procedure
To be considered for a scholarship from the Color & Appearance Division Endowment Scholarship Program, applicants must complete an on-line application in the Spring of 2025. Check www.specad.org for deadlines and for any additional updates to the process. All applications submitted must include:

1. A completed application form.
2. Three recommendation letters: two from a teacher or school official and one from an employer or non-relative.
3. A high school and/or college transcript for the last two years.
4. An essay by the student (500 words or less) telling why the applicant is applying for the scholarship, the applicant's qualifications, and the applicant's educational and career goals in the coloring of plastics industry.

For more information, visit www.specad.org or contact Ann Smeltzer at (412) 298-4373 or e-mail at ann.smeltzer@heubach.com

All scholarships will be paid directly to the recipients' schools. Schools must reside in the US and all funds are paid in US funds. The Color & Appearance Division Endowment Scholarship Program will not award scholarships to applicants who are not qualified and reserves the right to not award a scholarship in a given year if it so chooses.

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COLOR & APPEARANCE

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SPE COLOR AND APPEARANCE DIVISION MISSION STATEMENT

THE COLOR AND APPEARANCE DIVISION OF SPE STRIVES TO EDUCATE, TRAIN, INFORM AND PROVIDE PROFESSIONAL INTERACTION OPPORTUNITIES TO THE GLOBAL COMMUNITY INVOLVED IN VISUAL PERFORMANCE AND AESTHETICS OF PLASTICS.