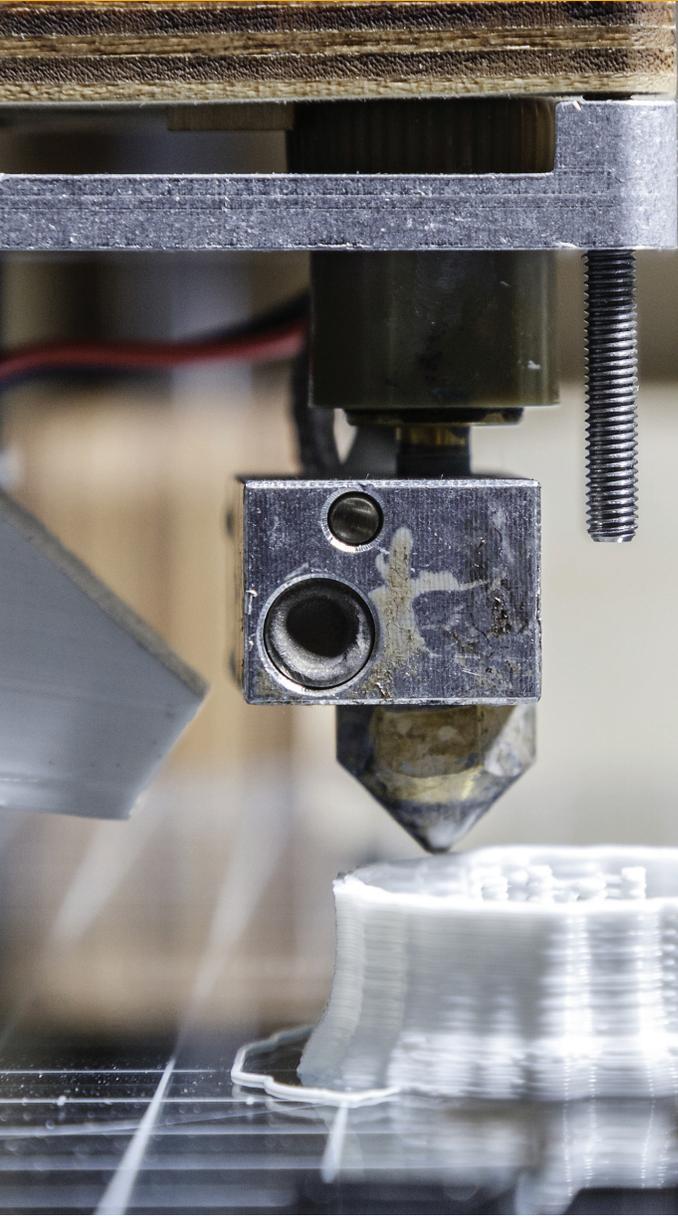


3D PRINTING – A FAST-MOVING MARKET



Developments in 3D Printing

A Sector by Sector Overview

This report explores developments in 3D printing across several sectors and categories for the half-year period of June 2021–December 2021.

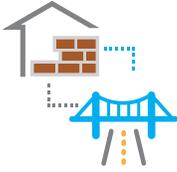


For more information,
please contact:

Mark E. Avsec
(216) 363-4151
mavsec@beneschlaw.com

Table of Contents

Construction & Infrastructure	2	Automotive	9
Manufacturing	3	Aerospace	10
Transactions	4	Sports	11
Sustainability & Environment.....	5	Materials	12
Military	7	Health and Medical	13
Food	8		



Construction & Infrastructure

World's first 3D-printed steel bridge opens in Amsterdam (July 15)

The world's first 3-D printed steel bridge, made of 4,500 kilograms of stainless-steel, opened in Amsterdam. The 12-metre-long MX3D Bridge was built by four commercially available industrial robots using welding torches to accumulate the structure of the bridge layer by layer and took six months to print. The attached sensors will be recording the strain, movement, vibration, and temperature across the bridge and the sensors will be fed into digital model for engineers to study the properties and apply machine learning to identify trends.

3D printing to help build UK's new high-speed HS2 rail link from 2022 (August 3)

The contractors behind the London terminal of the UK's upcoming High Speed 2 (HS2) rail network plan to start using 3D printing in 2022. The project HS2 will focus on preparing concrete slabs on-site along with the trial applications of graphene infused concrete for quick and sustainable approach.

3D printing soon be seen in Dubai's construction sector (August 5)

Vice President and Prime Minister of the United Arab Emirates, Sheikh Mohammed issued a decree in 2021 to regulate the use of 3D printing in the construction sector in Dubai. The decree aims to build 25% of buildings using 3D printing by 2030. It will also promote Dubai as a regional and global hub for 3D printing technology.

Asia-Pacific to be the fastest growing 3D printing region (August 17)

The Asia Pacific (APAC) region is expected to become the fastest-growing market for 3D printing in construction, according to a report by P&S Intelligence. The research found that this is primarily due to an increase in construction companies using the technology in their projects. The report also revealed that the region is rapidly becoming a global manufacturing hub due to the construction of numerous industrial and residential buildings, which is massively boosting the popularity of 3D printing technology. The research also identified Japan and China as the two major countries that are increasingly adopting 3D printing.

World's largest community of 3D-printed homes to enter Texas (November 4)

A new property development project in collaboration between Lennar and ICON and co-designed by the Bjarke Ingels Group is set to start in Austin, Texas. The project comprises of 100 single-story houses "printed" on-site using five of ICON's 46-foot-wide robotic "Vulcan" printers, which pipe out a concrete mix called Lavacrete. As per the firms, each house will take around a week to complete. The cost of the project has not been disclosed.

LafargeHolcim, CDC Group JV to build largest 3D printed affordable housing project in Kenya (December 6)

14Trees, a joint venture between building materials specialist LafargeHolcim and CDC Group, the UK's publicly owned impact investor, is building Africa's largest 3D printed affordable housing project in Kenya. The 52-house community will be located in Kilifi town, north of Mombasa, and will be part of the Green Heart of Kenya regenerative ecosystem. 14Trees has been supporting Africa's construction sector and develops 3D printing technology across the continent. 14Trees' 3D printing construction project utilizes Holcim's proprietary ink, TectorPrint, combined with a BOD2 robotic 3D construction printer provided by Danish 3D printing construction firm COBOD.



Manufacturing

Dewa unveils 3-D printed lab in the UAE (August 4)

The government of Dubai opened the world's first 3D printed research lab, and the Dubai Electricity and Water Authority's (DEWA) facility will be used for designing and creating the rovers, drones, 3D printing spares and prototypes. Along with the printing activities, DEWA will install a Metal X systems for efficient and productive gains. Through this project, the Dubai Government aims to enhance the 3D printing sector.

Stratasys becomes founding partner of Nfrontier's New Emerging Technologies Center (August 26)

The new Emerging Technologies Center in Berlin will focus on preparing hardware and software applications for clients. In addition, the center will merge the 'Eight Emerging Technologies' i.e., IoT, AI, Additive Manufacturing, Extended Reality, Robotics, Drones, Quantum Computing, and Generative Design at one place. Stratasys will provide 3D printers using FDM, PolyJet and P3 Programmable Photopolymerization technologies.

Laser beam to improve metal 3D printing (September 22)

Traditional laser beam in metal 3D printing can produce defects and poor mechanical performance. Hence, researchers at Lawrence Livermore National Laboratory studied optical beam shapes known as Bessel beams and found that Bessel beams can reduce the issues of laser powder bed fusion technique because these beams drastically enhance the laser scan parameter space compared to traditional beam shapes.

Adapted 3D printing technique produces partially magnetic objects (October 26)

Russia's Skolkovo Institute of Science and Technology, with a consortium, developed a process known as directed energy deposition, in which a heat source such as a laser is used to melt metal powder as it's being dispensed from a nozzle. This new technology permits the printing of single objects with gradient magnetic qualities.

Foundry Labs develops breakthrough digital casting technology (November 30)

New Zealand-based metal casting start-up Foundry Lab emerged from stealth mode after raising \$8 million in a Series A funding round. The company has developed a digital microwave casting technology that makes the same-day turnaround of metal castings possible. The company says its Digital Metal Casting (DMC) technology enables applications in mass manufacturing industries that metal 3D printing cannot yet reach. With DMC, the company says it can combine the freedoms of metal 3D printing with the part production speed and economy of metal casting.

**Transactions****Desktop Metal picks-up multi-material 3D printing firm Aerosint** (July 12)

Aerosint will operate as a subsidiary of Desktop Metal, with founders Edouard Moens de Hase and Matthias Hick serving as Managing Director and Innovation Director, respectively. The company's multi-material products and services will continue to be available to customers, while Desktop Metal has outlined its intention to integrate the technology behind such products into upcoming DM platforms within the next two years. Aerosint's patented technology enables full three-dimensional control of material placement during printing and has the potential to be integrated into powder bed additive processes like Binder Jetting, High Speed Sintering and Selective Laser Sintering.

Markforged launches IPO on NYSE following SPAC merger (July 15)

This marks the first time the metal and carbon fiber 3D printer manufacturer has put its shares on the New York Stock Exchange. Markforged went public following its merger with a Special Purpose Acquisition Company in a deal valuing the combined firm at \$2.1 billion. In going public, the newly-formed 'Markforged Holding Corporation' has raised \$361 million in gross proceeds, which it intends to use to fund the ongoing expansion of its product portfolio.

Fathom Digital Manufacturing to become publicly traded through special-purpose acquisition (July 20)

The company entered an agreement with Altimar Acquisition and, upon completing the transaction, said it expects to be listed on the New York Stock Exchange. Altimar will combine with Fathom to form a \$1.5 billion firm that's set to be backed with \$80 million in funding. Fathom says it has over 35 years of industry expertise and nearly 450,000 square feet of capacity nationwide across 12 facilities.

Essentium moving into 3D printing space with Collider acquisition (July 22)

Collider is known for Programmable Tooling, which combines Digital Light Processing (DLP) 3D printing and injection molding. Essentium says it will leverage Collider 3D's expertise in material science and 3D printing machine and use its technologies to boost mass customization and rapid product innovation. Collider's former CEO, Graham Bredemeyer, will join the Essentium team as the director of the Photopolymer Group.

Desktop Metal acquires binder jet 3D printer manufacturer ExOne for \$757M

(August 12)

Under the agreement, Desktop Metal will pay ExOne shareholders \$192 million in cash and \$383 million in shares. Desktop Metal says the integration of ExOne and its metal and sand binder jet 3D printing offering will create a “comprehensive portfolio” that combines throughput, flexibility and materials breadth. ExOne CEO John Hartner says the combination will help accelerate the adoption of production metal additive manufacturing. The deal is expected to be finalized in Q4 2021.

BCN3D closes acquisition of 3D printing software company AstroPrint (September 7)

The company says the acquisition will help advance its current and future software offerings. AstroPrint will remain an independent platform and continue to develop novel functionalities for its user base, while BCN3D will also integrate the company’s technology into its cloud offerings. BCN3D also said the entire AstroPrint software engineering team will be kept on and integrated with its existing software engineers. The combined workforce will be headed by AstroPrint co-founder and CTO Daniel Arroyo, who also becomes BCN3D’s Chief Software Officer.

3D Systems acquiring Oqton 3D Systems for \$180M (September 9)

The agreement will see 3D Systems pay Oqton shareholders \$180 million in cash and stock, in return for full control of their business. With the purchase, 3D Systems says it aims to create a platform that’s “instrumental in advancing AM,” and increase its annual software income to \$100 million by 2025. 3D Systems said it acquired Oqton due to its Manufacturing Operating System, which it believes has the potential to enable users to continually improve the performance of their machines within “full production environments.” 3D Systems will allow Oqton to continue operating independently, with data confidentiality and security protocols being put in place to protect user data.

Trilantic North America completes acquisition of 3D Systems’ on-demand printing business (September 22)

The private equity firm purchased 3D Systems’ global on-demand manufacturing service for \$82 million. The service will retain its “Quickparts” name, the same used by 3D Systems. Based in Atlanta, Quickparts was originally a specialist supplier of custom parts using a variety of technologies ranging from rapid prototyping to plastic injection molding, which 3D Systems Corp acquired in 2011 for \$15.9 million. Trilantic says it gains an established industrial brand that is an internationally recognized digital manufacturing leader in providing custom 3D printing and manufacturing services on demand.

Core Industrial Partners buys three Michigan 3D printing specialists (October 27)

The private equity firm acquired three Michigan-based companies specializing in 3D printing, equipment, and materials - 3DXTech, Triton 3D, and Gearbox3D. The companies being acquired all share a 68,000-square-foot facility in Grand Rapids. The financial terms of the deal were not disclosed. Core Industrial Partners says the investments line with its strategy to build an additive manufacturing platform focused on 3D printing equipment and proprietary materials.

Essentium plans to go public via \$974M SPAC merger (December 2)

Essentium unveiled plans to go public via a merger with Special Purpose Acquisition Company Atlantic Coastal Acquisition. Set to be completed by the end of Q1 2022, the deal will see the firms combine into a joint venture worth an estimated \$974 million. The proceeds are expected to primarily fund organic growth.

**Sustainability & Environment****Eight companies join AMGTA to promote benefits of additive manufacturing** (July 27)

Stratasys, 3D Metalforge, 3D Systems, 3YOURMIND, AMT, Hyperion Metals, NatureWorks, and The Barnes Global Advisors joined the Additive Manufacturer Green Trade Association (AMGTA), the industry's first trade organization dedicated to promoting and educating the benefits of sustainability with 3D printing. The organization now has a total of 28 members. Stratasys will also become a fifth Founding Member and help determine the strategic direction of the AMGTA, provide governance oversight, and consider future research projects that members may vote to commission.

3D concrete printing robots cut 50% of UK rail construction carbon emissions (August 4)

The technology, called "Printrastructure," was developed by HS2 Ltd's London tunnels contractor SCS JV, and will aid in the construction of the UK's second high-speed rail line, connecting London, Birmingham, Manchester, and Leeds. The 3D printing method, which reinforces concrete with graphene, will reduce the rail network construction's carbon emissions. The use of remotely-operated robots will allow SCS JV to 3D print structures on-site, saving them from having to transport those structures by road before lowering them into place using large cranes. The 3D printing technique also allows for structures to be built in tight spaces meaning that otherwise challenging and expensive logistical operations will no longer be necessary.

GE Research, partners to develop 3D printed system for capturing CO2 (August 25)

The R&D firm, together with UC Berkeley and the University of South Alabama, was awarded a two-year, \$2 million project through the U.S. Department of Energy's Office of Fossil Energy and Carbon Management. As part of the AIR2CO2 research project, the partners will combine 3D printed heat exchanger technology with sorbent materials to develop a system for effectively extracting CO2 from the atmosphere. The Department of Energy's award totals \$1.5 million, with a cost share of \$500,000 from GE and its University partners.

ArchiREEF says 3D printing to help save Hong Kong's coral (September 12)

The spin-out company from Hong Kong University says 3D-printed terracotta tiles can help corals grow and restore ocean life. Coral reefs are under threat from climate change and pollution, and ArchiREEF says the technology can regrow coral and help "reset the clock." The 3D-printed tiles is just one part of archiREEF's business model, as it also plans to identify a site for restoration, install the reef tiles, and continue to manage the site for up to five years, monitoring the growth and the biodiversity of the reef.

**Military****U.S. Marines using 3D printing to aid in mine-clearing missions** (August 31)

The U.S. Marine Corps are using 3D printing to create headcaps for a rocket motor used to detonate an M58 Mine Clearing Line Charge (MICLIC). The MICLIC is a rocket-projected explosive line charge that clears a path through minefields and other obstacles on the battlefield. The marines say 3D printing the headcap cut back on costly and time-heavy traditional manufacturing techniques, and provided a more efficient method for producing the part. The U.S. Marine Corps has recently called for greater adoption of 3D printing, and continues to explore the technology's potential to improve processes, parts, lead times, and cost savings.

U.S. Air Force, Essentium collaborate on 3D printing solutions (July 28)

The two launched a collaboration to apply additive manufacturing to help solve critical needs for both the Air Force and the National Guard. Essentium will work on the development and deployment of advanced AM solutions for tooling, ground support equipment, and maintenance repair parts for both aircraft and ground vehicles. The long-term goal is to better leverage 3D manufacturing technologies to help not only with costs and lead times, but with part reliability and availability to address overall fleet readiness, along with creating sustainable technology.

U.S. Marines using 3D printing, additive manufacturing technologies to produce spare parts (July 19)

The Marine Corps wants to establish a secure, digital repository that Marines anywhere could tap into for help building needed spare parts with 3D printers. The long-term goal is a true program-of-record style repository called the Digital Manufacturing Data Vault (DMDV), which would be a one-stop-shop for approval process, version control, approved part drawings and technical data packages for 3D printing. The Marine Corps plans to implement the DMDV during fiscal 2024.

**Food****Novameat to mass-market 3D printed vegetarian steak in 2022** (July 2)

The Barcelona-based bioengineering startup Novameat says it is capable of 3D printing a vegetarian steak that mimics the texture and taste of beef or pork. Founder and CEO Giuseppe Scionti created a reddish paste made up of ingredients such as rice, peas, and seaweed protein which contain amino acids with nutritional properties, that could then be shaped into a fillet using a customized 3D printer. The steak is then “cooked” to further enhance its texture. Novameat is aiming to recreate the muscle fibers of animal meat using 100% plant-based ingredients, and plans to sell its steaks to consumers and businesses like restaurants in 2022 in a bid to enter the alt-meat mass market.

Redefine Meat releasing 3D printed meat-alternatives product line following \$29M raise (July 28)

Redefine Meat, which makes plant-based meat alternatives using 3D printing, says it will launch in Europe following a \$29 million fundraising round and news it plans to build a first-of-its-kind large-scale factory housing both meat and plant-based 3D printed food products. Redefine Meat rolled out its first 3D-printed plant-based steak product in 2019, and says now it can produce volume and handle the costs for large-scale commercial markets. Redefine Meat will release its first ‘New Meat’ product range to Europe in late 2021, followed by Asia and U.S. in 2022.

SavorEat, Sodexo partner for 3D-printed food pilot at select U.S. universities (August 26)

Starting in 2022, the pilot will examine, test, and eventually commercialize SavorEats’ Robot Chef system and the first alternative meat product, a plant-based protein burger. Following this, the partners hope to reach a distribution agreement to deliver SavorEat’s products throughout the U.S. market. Founded in 2018, SavorEat uses a combination of 3D printing technology and advanced cooking methods to produce plant-based alternatives to meat products. The company’s Robot Chef simultaneously extrudes and cooks plant-based proteins to form alt-meat products that imitate the taste and texture of meat. The technology also enables the printing of alt-meats that cater to a person’s preferences regarding allergies and other genetic modifications.

Osaka University scientists create Wagyu beef with 3D printing (August 29)

Wagyu beef is known for its high content of “intramuscular fat” and marbling. The scientists used two types of stem cells: bovine satellite cells and adipose-derived stem cells, insulated from Wagyu cows. They then incubated and coaxed the cells into becoming the various cell types required for the individual fibers for muscle, fat, and blood vessels. The scientists say that by improving this technology, it will be possible to not only reproduce complex meat structures, such as Wagyu beef, but to also make subtle adjustments to the fat and muscle components.

Columbia University engineers using robotic lasers to cook 3D printed chicken

(September 21)

The “Digital Food” team at the Columbia University School of Engineering and Applied Science is exploring various ways to cook by exposing raw 3D printed chicken structures to near-infrared and mid-infrared lights. They then assess the cooking depth, color development, moisture retention and flavor differences of the laser-cooked 3D printed samples in comparison to stove-cooked meat. Engineers are optimistic about the possibilities of their laser-cooking technology, as the hardware and software components used are fairly low-tech, but note the absence of a sustainable ecosystem to support the technology, and the difficulty in scaling up the process, need to be addressed. The engineers are ultimately seeking to create suitable technologies for the cooking of 3D printed foods that stand with the texture and flavor alongside traditionally-cooked meats.

**Automotive****3D Printing creating opportunities for innovation in motorsports** (July 15)

3D Systems, a 3D printing-focused engineering company based in South Carolina, said early 3D printing allowed for prototyping and manufacturing aids for motorsports, but now 3D printing can offer rapid functional prototyping. Whereas before 3D Printing allowed for easy production and tweaking of models for wind tunnel testing, advancements now allow for more real-world use parts and testing for motorsports experts. This includes being able to print and use metal structural components, body exterior parts and panels, powertrain and engine components, performance cast metal parts, and air, fluid and energy management components in real-world testing, not just wind tunnels. 3D Systems says relying on traditional manufacturing processes is not a good approach, especially when it comes to production and environmental concerns, and 3D printing will allow more degrees of freedom to innovate and solve as the technology advances.

VW testing 3D printed components for car production (July 19)

Volkswagen aims to produce up to 100,000 components by 3D printing annually at its main plant in Wolfsburg, and says it has already produced its first 3D printed components to be sent for certification. VW said its components for the A-pillar of the T-Roc Convertible are almost 50% lighter than conventional components made from sheet steel. The manufacturer uses a printing method which uses an adhesive during the binder jetting process they claim results in lighter and cheaper to produce components. Volkswagen has also established a joint expert team together with HP and Siemens to train employees on how to use its 3D printing tech.

**Aerospace****Space sector increasing investment in 3D-printed technology** (August 13)

A number of large aerospace companies have increased their investment in the 3D printing of spacecraft, satellites and rockets. In February 2021, Airbus announced it would use 3D printing for the production of 500 radio frequency components for the Eurostar Neo spacecraft, which are set to join the Eutelsat fleet. The company also 3D printed a combustion chamber. Another company, Boeing, produced the first 3D printed antennae in 2019, and has used the technology to print components of its SES-15 spacecraft. This shift has subsequently led to a trend in the 3D printing space sector known as “On-Orbit Manufacturing.” Manufacturing parts in space itself rather than launching them from earth, OOM presents a challenging but potentially opportunistic dynamic in the development of parts in a microgravity environment. NASA, along with U.S. Company MadeInSpace sent the first commercial 3D printer to the International Space Station in 2016. Victoria Bosomworth, associate aerospace and defense analyst at GlobalData, adds the increasing importance of defense platforms in space paves the way for the rise of 3D printing as not only beneficial but an essential part of the space sector’s production process.

Incus Partners, European Space Agency testing micro-gravity 3D printing (October 8)

The Austrian provider for lithography-based AM solutions is partnering with the European Space Agency (ESA), OHB System AG and Lithoz GmbH to test Incus’ Lithography-based Metal Manufacturing process in a micro-gravity environment. The partnership will test whether it is actually feasible to process scrap metals from the Moon’s surface and create a high-quality final product using this zero-waste process. They will also research a number of potential limiting factors such as the impact of potential contamination of metal powders with lunar dust and whether the final parts will be as optimized and reliable as they might be on Earth.

NASA partners with small businesses to advance 3D printing in space (October 28)

Working through a Small Business Innovation Research contract, NASA researchers are developing sensors that could automate 3D printing metals in space. Electron Beam Freeform Fabrication (EBF3) uses an electron beam gun, dual wire feed, and computer controls to manufacture metallic structures, but the process relies on a human to observe and adjust the system. Removing humans from the equation and implementing a higher degree of control and repeatability would allow the process to be certified for building human spaceflight structures, like rocket segments and next-generation airplanes. NASA also believes EBF3 offers a potential Swiss Army knife tool for space, and could be a multi-purpose tool useful for extended human missions to the Moon, and eventually Mars.

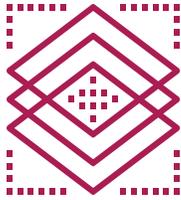
**Sports****Olympic Sprinter Usain Bolt enters five-year endorsement deal with SprintRay**

(October 20)

SprintRay is a global 3D printer manufacturer and dental solutions provider. The partnership will launch “Bolt Labs, powered by SprintRay,” an initiative with the goal of providing accessible dental care in Jamaica via 3D printing. Furthermore, the SprintRay Foundation, in partnership with the Bolt Foundation, will establish dental clinics, equipped with 3D dental labs to address the exigent dental needs of the Island’s citizens, especially those located in the more remote areas of Jamaica. Bolt, born in Jamaica, and SprintRay also plan further collaborations with the Jamaican Dental Association.

Golfer turns to 3D printed clubs (November 10)

Bryson DeChambeau is testing Cobra’s new 3D printed prototype irons. While testing the irons, Bryson made note of how impressed he was with the ball speed and spin rate he was generating. 3D printing allows for more rapid and consistent prototyping than other methods of club creation, according to Cobra. It also allows greater ease of “feel replication.” The fully 3D printed clubs are the latest iteration of a multi-year process that has seen multiple models printed, tweaked, and tested to adjust shapes, sole widths, face thickness, and bounce.



Materials

3D printing composites will be a \$2B industry within the next decade (July 22)

3D printing of fiber-reinforced polymers is continuously growing, along with the 3D printing of thermoplastic composites using variations on fused filament fabrication. IDTechEx predicts that by 2031, 3D printing using composites will reach \$2 billion.

NASA to check moon rocks for 3D printing material (August 15)

NASA sent 3D printer to ISS for the Redwire Regolith Print (RRP) project to figure out the ability of extraterrestrial material for construction purposes. According to NASA, this technology could be used to develop landing pads, habitats etc., and would save the time of bringing raw materials for such construction.

MakerBot 3D printing technology harnessed by Lockheed Martin for NASA Lunar Rover program (September 16)

Lockheed Martin included the MakerBot MethodX platform to its Advanced Technology Center. The reasons to add 3D printing technology were to reduce cost and to have flexibility in design proficiencies. The mount of a LIDAR was also printed with MakerBot Technology and for the project, Lockheed Martin has used MakerBot ABS and Stratasys SR-30 soluble support materials too.

MIT researchers seek to accelerate the discovery of new materials for 3D printing (October 15)

Researchers at MIT developed a machine learning algorithm to optimize new 3D materials with multiple characteristics. This data driven process is beneficial to reduce cost and reduce the amount of chemical wastes. To test the system, the researchers are using formulations for a new 3D printing ink that toughens in presence of UV light.



Health and Medical

CSIRO develops silicone resins suitable for 3D printing medical parts (July 20)

According to CSIRO's Dr Tim Hughes, the resins could be used in 3D medical devices such as dental, hearing aids, prosthetics and implants. As per CSIRO, the resins are non-toxic, transparent and have the ability to print irregular, thin and hollow designs with high resolution.

Scientists turn pollen into 3D printing ink for biomedical applications (August 25)

Scientists at Nanyang Technological University, Singapore derived a way to use sunflower pollen for 3D printing ink. According to the researchers, such inks are delicate which creates difficulty in retaining the final product. The scientists printed a biological tissue 'scaffold' and in lab studies it was concluded that it was appropriate for cell adhesion and growth, which are essential elements for tissue regeneration.

Scientists develop 3D printed microneedle vaccine patch that outperforms jabs

(September 24)

Scientists at Stanford University and the University of North Carolina at Chapel Hill developed a 3D printed microneedle vaccine patch and as per their claims, the patch has 10 times better immune response than a typical vaccine shot. The patches are typically made of tiny 3D printed microneedles arranged on a polymer patch and are applied directly to the skin.

Scientists 3D print living brain cells in "promising development" for bioprinting

(September 26)

Researchers from the University of Montréal, Concordia University and the Federal University of Santa Catarina printed living mouse brain cells using Laser-Induced Side Transfer technology and the majority of the cells were alive for two days after printing. The researchers believe that the potential for bioprinting is huge in terms of drug testing, implant fabrication, disease modeling, and cell replacements.

Scientists 3D bioprint articular cartilage protheses from stem cells (September 27)

Scientists from the Nakayama Lab at Saga University and Kyoto University in Japan developed cartilage structures with scaffold-free Kenzan bioprinting process using human induced pluripotent stem cells. The focus of the study is to cure conditions such as arthritis in a sportsperson who does not want to undergo treatment with artificial joints made of metal and plastic.

British man because first patient to receive 3D printed eye (November 25)

A British man has become the first patient in the world to be fitted with a 3D printed eye, according to Moorfields Eye Hospital in London. The eye is more realistic than other alternatives, and is designed to have “clearer definition and real depth to the pupil,” the hospital said. Fitting traditional prosthetics requires a mold to be taken of the eye socket, whereas in 3D prosthetic eye development the socket is scanned digitally to create a detailed image.

Research finds 3D printing of blood plasma could help wound healing

(November 30)

Research by RCSI University of Medicine and Health Sciences suggests that effective wound healing may be aided by replicating platelet-rich plasma (PRP), a crucial component of blood. The study explored ways of enhancing the wound healing process by extracting PRP from the blood of a patient with a complex skin wound and manipulating it through 3D printing to form an implant for tissue repair which can be used to treat difficult-to-heal skin wounds in a single surgical procedure. Results showed that application of the 3D-printed PRP implant helped to speed up the healing of the wound by enabling efficient vascularization and inhibiting fibrosis, both of which are essential for effective wound healing.

BMF, 4D Biomaterials partner to bring bioresorbable materials to micro 3D printing

(December 7)

Boston Micro Fabrication (BMF), a pioneer in microscale 3D printing systems, and UK-based 3D printing materials company 4D Biomaterials announced the capability to print micro-scale geometries using 4Degra bioresorbable materials. This achievement marks the first time a bioresorbable material has been printed using micro 3D printing and will revolutionize the way implantable medical devices are manufactured in the future. Aimed at creating biocompatible and bioresorbable micro-scale medical devices, the joint innovation has a variety of applications and opportunities for medical device manufacturers and innovators, ranging from micro-scale rigid orthopedic devices and fixations through to micro-scale soft tissue applications.