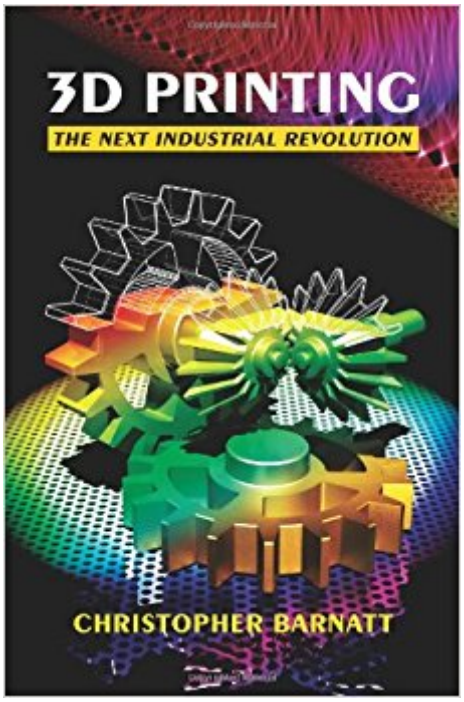
3D Printing: The Next Industrial Revolution



Synopsis

NOTE: There is an updated version of this book calledÂ 3D Printing: Second Edition. 3D Printing is about to transform our lives. While traditional laser and inkjet printers only make marks on paper, 3D printers build up solid objects in a great many very thin layers. Already pioneers are 3D printing production tools, prototypes, jewelry, sunglasses, works of art, toys and vehicle parts. But this is just the beginning, with digital manufacturing destined to change how we create, transport and store a great many things. Within a decade, some products may be downloaded from the Internet for printout in store or even at home. Already DIY enthusiasts are building their own 3D printers, while consumer models for the rest of us are just starting to arrive. Meanwhile doctors are learning how to 3D print kidneys and other replacement human organs.3D Printing: The Next Industrial Revolution explores the practicalities and potential of 3D printing today, as well as trying to realistically foresee the impact of 3D printing on the world of tomorrow. The book is written for a wide audience, including 3D printing enthusiasts, entrepreneurs, designers, investors, students, and indeed anybody who wants to be more informed about the next round of radical technological change. Â Particular features of the book include an extensive chapter that details every current 3D printing technology, as well as an industry overview covering 3D printer manufacturers, software providers, and bureau services. These chapters are then supported by an extensive 3D printing glossary (of over 100 terms) and a 3D printing directory. Â Other key content includes a chapter on developments in digital manufacturing. This features interviews with a range of pioneering individuals and organizations who are already in the business of 3D printing final products or parts thereof. There are also chapters dedicated to 3D printing and sustainability, bioprinting, and personal fabrication.

Book Information

Paperback: 276 pages
Publisher: CreateSpace Independent Publishing Platform (May 4, 2013)
Language: English
ISBN-10: 148418176X
ISBN-13: 978-1484181768
Product Dimensions: 5.2 x 0.7 x 8 inches
Shipping Weight: 13.6 ounces (View shipping rates and policies)
Average Customer Review: 4.3 out of 5 stars 22 customer reviews
Best Sellers Rank: #843,451 in Books (See Top 100 in Books) #80 inÂ Books > Computers &

Technology > Graphics & Design > 3D Printing #126 inÂ Books > Crafts, Hobbies & Home > Home Improvement & Design > How-to & Home Improvements > Power Tools #2326 inÂ Books > Computers & Technology > Hardware & DIY

Customer Reviews

Christopher Barnatt is a futurist, videographer and Associate Professor of Computing and Future Studies in Nottingham University Business School. He has written eight previous books and numerous articles on future studies and computing, appears regularly in the media, and runs the websites ExplainingTheFuture.com, ExplainingComputers.com and their associated YouTube channels. You can follow him at twitter.com/ChrisBarnatt.

I bought this book because I had questions about what was possible with 3-D printing. This book gave a pretty good overview of what it can do, who the players are in the industry, and the prospect of future developments.So these are the questions that I had:What materials can it work with? The answer is that 3-D printing is most commonly done with plastics. The printhead melts plastic and applies it layer by layer to form a solid three-dimensional object. This is useful for forming models or creating die casts. One limitation of the process is that since each layer must be supported by the one underneath, a figure in which one part descends below everything else must be supported by props of one sort or another. You could build a cow from the legs up, but the udder would need a support. This doesn’t seem like a tremendous shortcoming. Other limitations of plastic (melting temperature, hardness, and the fact that it is only a single material) are more significant.What materials can be printed? For the time being, plastics are the most common. Ceramic and metal powders are also printed. They are suspended in a binder material which holds the work together as it is created. The end product is about 40% binder, 60% target material; brittle and infirm. Additional steps are used to remove the binder and infuse the product with metal (or whatever) to create a durable, solid product.In some cases, plastics and metals can be applied in other than powdered form. They can both be melted. Certain liquid plastics can be "cured" optically, hardened by the application of light. One process has refined this to the level of individual photons; it can create incredibly detailed models. The limitations are again in the materials: they have plastic’s inherent weaknesses, and they are expensive.It appears to be difficult for the time being to mix multiple materials in the same 3-D printed object. This limitation is being overcome to some extent. Nonetheless, there was no indication that it was now possible, or would ever be possible, to print such complex devices as a motor with insulated electrical windings, or even a ball bearing. It seems

that the tight tolerances, the need for lubricants or bushings and so on would make these things impossible to render with today's technology.What is it used for today? Models, such as those to test the aerodynamic properties of race cars, prototypes so that people can look at what you propose in a design, casting masters for lost wax type for sand casting of metal parts, and direct manufacture of a few types of parts.One of the problems with almost all 3-D printing is that it is slow. Just as an inkjet printer is slower than a LaserJet, the 3-D printing processes described here pretty much involved moving a single printhead back and forth over an area. It has to traverse two dimensions at a time, and is stepped up through the third dimension layer after layer. The process is therefore quite time-consuming in all of the methods described.There is one exception, which is to do laser type printing of different layers, and then use a physical glue to put them together. This is mentioned as sort of an afterthought; it is not really 3-D printing.The idea of printing living tissue into three dimensions is also mentioned. How they do it is not. We know that skin grafts and some other tissues can be grown fairly effectively in laboratories and then applied pressure. Presumably, undifferentiated skin cells could be applied by some sort of a printing process. It seems unlikely that more complex organs could be grown. They did not discuss, and I cannot imagine how one would devise something as complex as a kidney using this process. The cells within such organs are differentiated, and at this point in time 3-D printing is not able to deal with so many different materials. Perhaps they could do it by using the same cellular material and trigger different gene expressions, making the RNA generate different types of cells. They are doing some fairly magical things in biotech, but this would seem to me to be on the outer fringes.It is well-known that there are plans downloadable from the Internet for printing firearms using 3-D printing. It does not seem to me from reading this book that it would be possible to put together rifles with rifled barrels, the kind of thing that would yield an accurate and reliable weapon. One can conceive that you could create a chamber and a barrel capable of receiving a round of ammunition and firing it. But it seems unlikely that it would be nearly the quality of a machine manufactured rifle.That is my take away from this whole thing. There are a lot of manufactured items in today's world, but relatively few of them are simple enough to be readily adapted to today's 3-D printing technology. It does not have the ability to deal with a large number of different materials, and does not have the ability to give those materials the physical properties that one needs for most manufactured items.3-D will be useful for the things issues for now, models. It will be useful for producing one-off parts, such as a transmission gear for a 1941 Ford. If you can describe it in a computer what is supposed to look like, and it can be made out of solid steel, it would be something that would lead itself to 3-D printing. Producing the entire transmission would not seem to be possible, because it would not be

able to produce the bearings/bushings and other such parts.My take as a technology investor is a 3-D printing will continue to grow in applications. There will be some fairly substantial annual growth among the companies in the industry. However, it will never come to a sudden, revolutionary adaptation of 3-D printing, resulting in instant fortunes of the type made on such companies as Microsoft, Oracle, Cisco and Facebook. This is an industry for the long slog. It employs a lot of great people, and there is a lot of innovation, but no single innovation is likely to arrive that will have dramatic industrywide repercussions.As far as home use goes, despite the author's enthusiasm, it is hard for this reviewer to envision a compelling reason to own one of these. I compare it to the color printer. I didn't get a color printer until they were cheap enough that it was a choice of why not. This is unlike the laser printer. I and many others ditched our dot matrix printers for lasers the moment we could, in the 1980s. It filled a major preexisting need, and HP made a fortune. I don't see that here.

The book is a semi-scientific introduction to the technology of 3D printing. It deals in detail with the methods the makers and then goes into the future. My only complaint is that the printer compounds really need a separate chapter. Good enough that I using this book as a reference in scientific articles.

Very interesting and easy to read. Extremely well organized. The kindle version provided all kinds of links to the factors/players he discusses

All that you want to know about 3d printing is in this excellent book. Easy to read and absolutely enjoyable.

3D Printing: The Next Industrial Revolution ...

Fast shipping, and has lots of info on 3D printing. Figured I'd do some research before I run out and buy a 3d printer..., But now I know more than I did, so the book probably was worth is..

Technique that will change the way of living in s few decades is quite clearly presented in the book. I guess the chapter bound to the personal use of the hardware and the development of the associated software requires a little more attention.

I started the book and could hardly put it down to do other things. Looking forward to get more from the same author.

3D Printing: The Next Industrial Revolution Evaluation of Industrial Disability: Prepared by the Committee of the California Medical Association and Industrial Accident Commission of the State ... of Joint Measures in Industrial Injury Cases. Natural Capitalism: Creating the Next Industrial Revolution Gelli Printing: Printing Without a Press on Paper and Fabric Printing by Hand: A Modern Guide to Printing with Handmade Stamps, Stencils, and Silk Screens The Platinum Printing Workshop: Platinum/Palladium Printing Made Easy Hand-Printing Studio: 15 Projects to Color Your Life â ¢ A Visual Guide to Printing on Almost Anything Regular Printing and Practicing for Success | Printing Practice for Kids Master Photographer's Lith Printing Course: A Definitive Guide to Creative Lith Printing Industrial Hydraulics Manual 5th Ed. 2nd Printing The Industrial Design Reference & Specification Book: Everything Industrial Designers Need to Know Every Day Industrial Fluid Power, Vol. 1: Basic Text on Hydraulics, Air & Vacuum for Industrial and Mobile Applications Fundamentals of Industrial Hygiene 6th Edition (Fundamentals of Industrial Hygene) Patty's Industrial Hygiene and Toxicology, Volume 3, Part B, Third Edition, Theory and Rationle of Industrial Hygiene Getting Started with 3D Printing: A Hands-on Guide to the Hardware, Software, and Services Behind the New Manufacturing Revolution the Next EXIT 2017 (Next Exit: USA Interstate Highway Exit Directory) Going Public: My Adventures Inside the SEC and How to Prevent the Next Devastating Crisis: My Adventures Inside the SEC and How to Prevent the Next Devastating Crisis The Next Bitcoin: Cryptocurrency Forecasting (the next millionaire maker) The Fifty-Year Mission: The Next 25 Years: From the Next Generation to J. J. Abrams: The Complete, Uncensored, and Unauthorized Oral History of Star Trek The Next IQ: The Next Level of Intelligence for 21st Century Leaders