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The World's Next Disruptive Technology

For today's investors… It's like "printing" money

by Ryan Cole

Last year, an 83-year-old woman received a new prosthetic jaw. An infection ate away so much bone, her doctors in the Netherlands decided she needed a replacement.

It is not something you go through every day… but not a radical surgery, either.

Except this surgery made worldwide news. The reason? Her fake jaw was made in an entirely new way… with an entirely new material… that made for a cheaper, easier surgery, and a faster, smoother recovery.

Let's take those ideas one at a time.

The new material is titanium… but, unlike titanium to date, it's got a honeycomb design. That makes it lighter without weakening strength, and leaves space for new bone to grow and better integrate the prosthetic into the body. With the honeycomb design, rejection of foreign material is much less likely.

The new jaw took only four hours to install — about one-fifth the normal time the reconstructive surgery takes. That's because, unlike regular prosthetics, this one was specifically shaped to match the woman's old jaw. It fit perfectly, without needing any special adjustments in surgery.

For the same reason, the woman's body accepted the jaw perfectly during recovery. In fact, it worked so well, the woman was speaking as soon as she awoke, and could swallow by the next day. She was at home after only four days — much faster than normal after such an intensive surgery.

Because the surgery took so much less time… and the patient was in the hospital for a much shorter stay… the cost of the surgery was well below the figure for the same procedure using a traditional prosthetic.

The one technology that made all this possible? 3-D printing.

A Game-Changer

Many people don't realize it, but 3-D printing has been around for a while. But after 25 years of integration into all sorts of design and manufacturing processes, 3-D printing is now expanding into entirely new markets.

It's doing things that are not possible using any other method.

New materials are being invented today — and old materials are finding new uses, thanks to an exactness that allows printers to reshape the basic structure of material. The honeycomb design of the above-mentioned titanium jaw is a good example.

3-D printing is so exact, in fact, that we can make parts that fit the most precise needs — down to the width of half a human hair. But, because these printers are infinitely flexible, we can also personalize each product.

No longer is a manufactured good one size fits all; it's now one size fits one.

Again, look to the jaw… or outer prosthetics, as we'll discuss… or the precise needs of racing cars, as BMW is demonstrating.

And making 3-D printing even more attractive — it isn't just better, it's also cheaper.

You don't need multiple machines to manufacture each part — you just need one.

You don't need excess material to cut away, as in traditional industrial design, which sometimes wastes large chunks of the original. 3-D printing is additive — you only need as much material as you're using. No more waste.

Finally, 3-D printing isn't just better… and cheaper… it's also faster.

That's because, rather than work up a design… then design machines to try it out… then go back to the drawing board if necessary, or start the whole process over again for any new iteration, 3-D printers go straight from design to product.

That's why architects have been using them to make models for years.

It's why auto manufacturers like GM and BMW use 3-D printers for their cars, with designers saying things like, "We would find it nearly impossible to build another car without using [3-D] technology." That's exactly what Paul Doe, the chief design engineer for the Mini World Rally Car, told a journalist recently.

3-D printing is no longer a niche product. It's fast becoming the must-have technology in all sorts of applications, from healthcare to autos to custom-made replacement parts for anything you could imagine.

And one company has its hand in all of these sectors. It is one of the biggest makers of printers… it makes money selling the services of those printers… and it is fast becoming one of the largest suppliers of 3-D printing materials in the world. Basically, wherever there is 3-D printing, this company has a piece of the pie.

The company is **3D Systems (DDD:NYSE)**, and, as you'll see, it already claims impressive sales in a rapidly expanding marketplace.

And it's not going to stop now. 3-D printing isn't just for corporations anymore. It's about to become the next must-have household appliance as well.

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But we're getting ahead of ourselves. Let's take a closer look at where 3-D printing is used today.

A Proven Technology

Next year, 3-D printing is expected to create a $782 million market. Some projections have the market reaching $1.5 billion by the end of 2012. With only a few companies operating in the space, that's more than enough revenue to keep things growing.

And 3-D printing is in the beginning of its run.

The technology is in its infancy — already in use in hundreds of applications, but nowhere near its full potential. That $782 million market size is tiny compared to what's coming.

Prosthetics alone are going to be a $15.4 billion industry by 2015, and, as you'll see, 3-D printing is about to dominate that market.

Dental materials are a $10.5 billion industry — and, again, 3-D printing is revolutionizing the sector, and swallowing up all competition in the process. Why get an inexact dental fit when you can print out perfect teeth, with a honeycomb design that encourages your body to integrate the new material seamlessly?

That's $25.9 billion right there — and, by the time we're done, that will only be a small piece of the 3-D printing market.

Healthcare may be the most immediate, and 3D Systems is positioned to be one of the largest players in the healthcare market. But the true measure of what 3-D printing can do is when you expand it out to other materials — materials that are already being printed today — turning the manufacturing industry on its head in the process.

Even better, 3D Systems is the leader in materials as well, with over 90 "inks" that can be used to print novel products, and the only full-color personal printer in the market today. If you want the flexibility to print whatever your mind can imagine — 3D Systems is the only place to go.

A Factory in a Box

If you've ever seen *Star Trek*, you know the replicator, a piece of machinery that could create any material good — a hot cup of tea or a Japanese katana, for example — on request.

The replicator "did it" by reorganizing atoms. We're not quite there — but we're getting close.

3-D printing doesn't work by manipulating atoms — but by manipulating molecules. Specifically, it works by taking any powderized material and spraying it to form… whatever you want.

Sneakers? Sure.

T-shirts? No problem.

Custom-made toys? Already happening.

Cakes with the sort of intricate designs impossible to do by hand? Right in the wheelhouse.

Really, anything that can be made into a powder can be shot through the nozzle of a 3-D printer. There are a few different methods, but the easiest and most complete is layered printing, which just happens to be the specialty of 3D Systems.

One layer comes out — usually about 0.1 millimeters thick — coated with a binding agent, and then the next comes out, until you're done.

3-D printing machines are factories in a box. Today, most of them are large and used for industrial applications. But that's changing — and fast. Sooner than you think, 3-D printers will be showing up in your home.

It's already happening.

Most things a person would want or use can be made faster, cheaper and personalized by a 3-D printer. That's true today.

Let me repeat: This isn't the future we're talking about.

This can be done *right now*.

All that's needed is a rollout of printers into wider use. And, as 3-D printers pass below the magic price point of $1,000 — as they're doing right now — you can be sure you'll be seeing these in homes within a few short years.

Further, 3-D printing can be applied in ways that traditional manufacturing would never dream.

That's why we're interested not only in what 3-D printing can do today, but in its promise for the near future… creating a new tech sector that could easily eclipse all the others combined.

Same-Day Bone Repair

Healthcare is one of the most interesting sectors being revolutionized by 3-D printing. And it goes well beyond surgical prosthetics.

Seamlessly replacing a jaw is one thing — but more extensive repairs are in the works as well.

Scientists at Washington State University have created a specialized ceramic powder that can be used as scaffolding for new bone.

Bone-like itself, this material can be printed out in any shape, size or form — individualized for any patient, based on CAT scans to fit perfectly — and can be attached to regular bone. In vitro tests start growing new bone within a week, and tests in rats and rabbits are providing stunning results. The scaffolding serves to support weight… and promotes bone growth overtop.

By the time the gaps have been filled in, the material dissolves away with no ill effects… leaving a perfectly regrown bone. When done right, the patient shouldn't be able to tell anything ever happened.

Meanwhile, thanks to the strength of the material, a patient can continue living life as normal, without having to watch muscles atrophy or go through weeks or months of physical therapy.

The professors developing this see it as a great way — in some cases, the only way — to repair jaws, hips or spines, without prosthetics or extreme surgeries.

Perhaps best of all, the process costs one-tenth as much as traditional techniques. And it's going to start rolling out to hospitals in just a few years.

Once this becomes commonplace, any structural problems in the body will be reparable thanks to 3-D printing.

Lifesaving Treatments

One day in the future, you might go to the doctor and get some bad news — you've got a bad pair of kidneys. But, not to worry — the hospital is going to print you out a new kidney, and implant it next week.

We may solve cancer, not by defeating it, but just by replacing any organ it damages.

3-D printing is already in the testing stages for replicating organs; exactly when it'll be ready for practical use is unknown, but my bet would be sooner rather than later.

That's because all the obstacles in the way are being cleared. Structure isn't a problem. 3-D printing is custom-made to create perfect, intricate structures. Now 3-D printing is tackling blood vessels — the pathways responsible for getting nutrients to organs.

Last year, scientists at the Fraunhofer Institute in Germany were able to perfect a method of printing out blood vessels — the next step in making working organs.

Thanks to new abilities developing today, it won't be long before waits for organ transplants are a thing of the past. We won't need organ donors; we'll just need accurate 3-D scans.

It sounds like science fiction, but it's not. At Wake Forest University, scientists are printing tissue to treat burn victims. At the Medical University of South Carolina, researchers are printing out prototype kidneys.

In fact, scientists are already printing out usable kidney cells thanks to very accurate CT scans of the cells, and precise 3-D printing capabilities. Once a single layer of cells is done, it's an easy, fast process to "print" a whole kidney.

Even working prototypes of heart valves are being made today. They haven't been tested in humans yet but they will be soon.

There are even systems being worked on to bring this technology into the field — so a single machine could go to the scene of an accident, scan the body and print out a replacement part right there.

It's all possible thanks to 3-D printing — a technology that's accurate down to 20 microns, allowing for precise, customizable replacements for damaged body parts.

Much of this is still a few years away. But the simpler materials — like cartilage, bone and teeth — are right around the corner. We're measuring in months, not years.

And some of this isn't in the future at all: It's happening now.

The Bionic Man

Thanks to 3-D printing, outer prosthetics have never been better.

They've never even been close.

3-D scanning has made it possible for manufacturers to get a precise measurement of bodies — making for a perfect model. And with 3-D printing, they can now make prosthetics that fit the body perfectly.

And, in a nod to aesthetics, the prosthetic limbs look great. Made to match existing appendages, new prosthetics are more realistic than ever.

"For the first time in his life (as an amputee), kids on the street are jealous of him," Scott Summit, one of the leading designers of 3-D prosthetics, recently told CNET about one of his customers. "No one's ever been jealous of him."

But it's not just about appearance. These prosthetics are more useful than ever as well. Increasingly, losing a limb doesn't mean losing mobility or ability. The military is already paying for 3-D printing to create strong, durable, lightweight and highly capable prosthetics.

A Huge Market for Tiny Companies

As mentioned above, the prosthetic industry will be worth $19.4 billion by 2015. The dental material industry is worth about $10.5 billion today.

There are over 112,000 patients in America awaiting organ transplants, with another name added every 10 minutes.

The U.S. hosts approximately 6.8 million broken bones that need medical attention every year. Aside from minor broken bones like hairline fractures, every single one of those industries will soon be taken over by 3-D printing. That's tens or hundreds of billions of dollars, every year.

Not bad for a sector that remains untapped — the largest 3-D printing companies are right around a $1 billion market cap. The healthcare potential for 3-D printing is so great, we could see multiple ten-baggers coming out of the 3-D printing industry.

But what if I told you, as big as bioprinting will be, it pales next to 3-D printing's complete potential?

It's true. Let me explain.

The Beginning of the Growth Curve

The same way you could have made a fortune investing in cellphones in the years before they became ubiquitous, you can make a fortune now, getting in on the ground floor of an entirely new industrial paradigm.

Making parts for cars… and replacement parts for motorcycles… and complete products of simpler items, like clothes… is happening today. And it's completely changing the way we'll get all our physical goods.

That's not to say that old-fashioned metal casting or plastic molding is going out of business. The structural changes that occur when you heat something, for instance, are very different from when you reduce it to a powder and then reconstitute it.

But 3-D printing is preferable for virtually every household item. And we're discovering that many materials will be better using the 3-D printing model.

And, as I mentioned, 3-D printing is starting to come off the factory floor… and into homes.

That's thanks to a few advances.

Better material: We're seeing an exponential increase in the number of materials that 3-D printing can handle. It used to be only a few polymers that 3-D printing could use — today, we're dealing with plastics, nylons, metals and more. A few thousand materials should only be a few years away.

Better pricing: Since 3-D printing started being used in manufacturing in the 1980s, prices have plummeted. What used to be the sort of machine only a company could afford, costing millions of dollars, now can be had in a printer kit for as little as $500.

More reasonably, a complete printer runs a little south of $2,000 shipped. We're quickly entering the consumer arena. This is just like the shrinking of the computer from something building-sized to something palm-sized.

As *The Economist* said with typical British understatement, "Revolution may not be too strong a word."

Better ideas: For a long time, 3-D printing was something that an architectural firm would use to mock up plans quickly and easily. That sort of use is becoming outdated.

Today, there are already firms like Shapeways and Sculpteo that let you upload your own design ideas for a product, print it out and ship it to you.

That's interesting — but those companies are about to get skipped. To put it simply: 3-D printing is fast becoming cheap enough — and powerful enough — that every home will have one.

As *The Economist* said with typical British understatement, "Revolution may not be too strong a word."

Outside the Box

Imagine deciding you wanted some new pants, because you'd lost a little weight — and printing out a copy custom-built to your exact specifications. They fit like a glove — and, as soon as they don't, you recycle the old and print out a new pair.

Imagine your teenage daughter falls in love with a viral video, so she decides to print out a T-shirt that references it. Next week, when she falls out of love, she can print out a different T-shirt following her new fad.

To celebrate your spouse's birthday, you make a personalized cake. Perhaps he or she takes a new interest in tennis — print out a racket! The only cost is the "ink" used to do the printing, and the electricity to run your machine.

Not only will thousands of products be available from the comfort of your home, you'll be able to personalize them to your heart's content.

No longer will you have to wear or use what companies think you want — you'll be able to customize nearly everything. And, for the things you don't want to think too much about, there will be plenty of standard prototypes available that you can modify… or not.

Home 3-D printing won't just revolutionize the tech industry, it will alter

the entire relationship consumers have to their products. This is a game-changer.

It's not going to happen overnight — but it's starting to happen now.

Thanks to advances in materials, and price drops for the printers themselves, 3-D printing is about to become available to the masses. All that's needed to get the ball rolling is a small imaginative spark — and then everyone will want one.

First, as a luxury item in wealthier households… but soon thereafter, as a consumer item in every household.

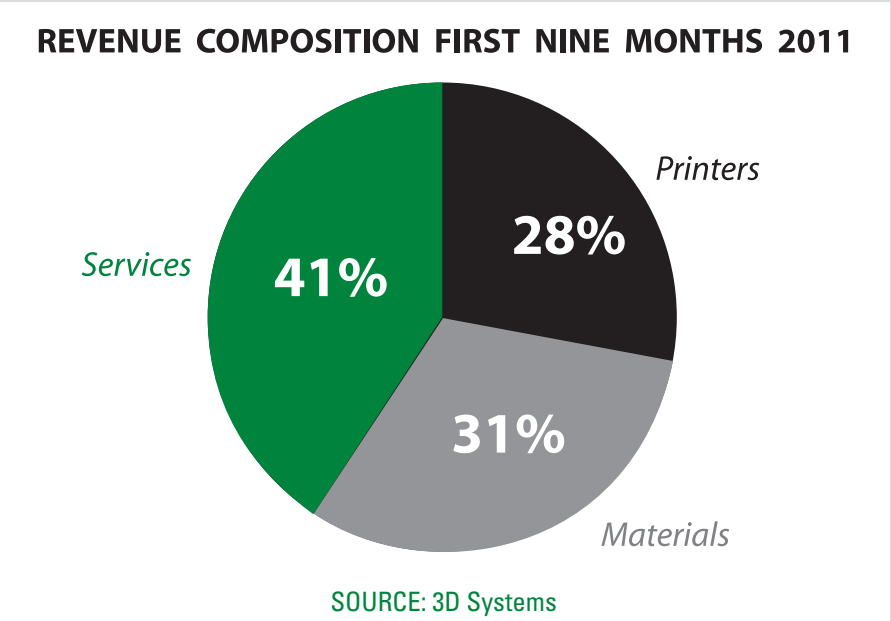
That's not to say there aren't hurdles ahead. Copyright will be a big deal; already, the file-sharing site Pirate Bay is carrying CAD files (CAD files are the ones a 3-D printer reads to print out a design).

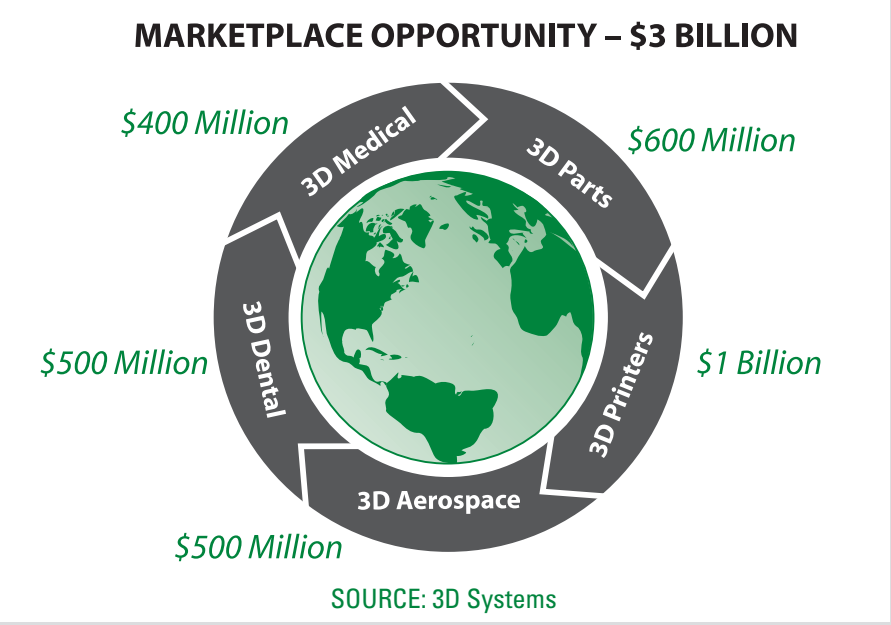
As 3-D printing grows, we're sure to see consumers and producers butting heads, much as we did with the growth of digital music.

But, just as with digital music, the better form will win out. Once iPods became ubiquitous, the process became a no-brainer.

So it will go for 3-D printing.

And that's why I recommend the Apple of this space — the largest, most dominant company, the one making the iPod equivalent of digital printers.





One Company to Rule Them All

3D Systems is far and away the dominant player in this market.

It's already profitable. If none of our future predictions for 3-D printing come true, 3D Systems will do just fine making products for current-day applications, thank you.

It's one of the largest companies in this sector and quickly buying out promising competition. In just the past 10 months, it's bought up four 3-D printing companies… and that doesn't include its purchase of Z Corporation and Vidar Systems to ring in the new year.

With those purchases, 3D Systems is fast becoming the dominant one-stop shop for 3-D printing. It has the largest reach, and it covers all aspects of the process (including design software, the "ink" for the printer, biotech solutions, professional and personal systems, and on-demand custom-part services).

For two years running, *Design World* magazine has recognized 3D Systems as the leader in design technology. For five years running, the company has increased its profit margin and its operating margin. Last year, sales increased 56.9%.

But that's nothing. Thanks to the breakthroughs we're talking about, 3D Systems increased net income *19 times*. That's the sort of growth you just don't find — anywhere.

And it's nowhere near tapping its complete potential. Indeed, 3D Systems sees itself owning the largest chunk of a $3 billion sector — *right now*.

3D Systems is the market leader in an exponentially growing market. It started trading in the NYSE just last year, but, unlike most young companies, it's quite profitable, and has enough cash (and a strong enough cash flow) that it's been on a buying spree. Even spending that money, debt has gone down every year.

Further, despite a dominant position, 3D Systems has a more modest P/E than many of its smaller competitors in the same space.

I'm not the only insider who sees the potential here. Institutional investors hold 71% of the stock, indicating a strong belief amongst the in-the-know crowd that this is a company you want to own.

Better yet, it's been on a tear to start the year. The world is waking up. 3-D printing is the next must-have tech, and savvy investors are all climbing aboard the bandwagon right now.

Oh, we could wait a little longer and still make a tremendous profit. But we have to act now to get in while this company remains a small cap, before it takes its rightful place as one of the dominant technology manufacturers on the exchanges.

Even if all new applications of 3-D tech were cancelled today… and 3D Systems only ruled the sectors where 3-D is already established and growing… this company should hand us a triple-digit winner. Every year, income has increased — jumping, again, almost 19-fold from 2009 to 2010 (with 2011 looking to be the best year yet).

This company has the look of a huge winner. That's why we're getting in now, before too many realize it. After the most recent tear, 3D Systems is likely to take a little breather and pull back just a bit — we'll grab our shares then. ■

To your success!

Ryan Cole

Editor, *Small Cap Insider*

ACTION TO TAKE:

Buy 3D Systems (DDD:NYSE) at $22 or less.

IMPORTANT INFORMATION

Your April issue will be published online on Monday, April 2, 2012.

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Small Cap Insider Portfolio

STOCK NAME	STOCK SYMBOL	ISSUE/ALERT RECOMMENDED	ENTRY PRICE	DIVIDEND YIELD	COMMENTS
Career Education Corp.	CECO	January 2012	$7.97	–	Pure play on value — Buy under $8
Zumiez	ZUMZ	February 2012	$27.66	–	A nod to Sam Walton — Buy under $30
3D Systems	DDD	March 2012	NEW	–	A piece of the 3-D printing pie — Buy under $22

Special Report Recommendations

STOCK NAME	STOCK SYMBOL	DATE OF FIRST RELEASE	ENTRY PRICE	DIVIDEND YIELD	REPORT RECOMMENDED
Glu Mobile	GLUU	11/28/11	$2.85	–	The Four Best Tipping-Point Trade Recommendations for Cashing In on the 'Protocol 5' Revolution
Majesco Entertainment Company	COOL	11/28/11	$2.73	–	The Four Best Tipping-Point Trade Recommendations for Cashing In on the 'Protocol 5' Revolution
Chyron Corporation	CHYR	11/28/11	$1.35	–	The Four Best Tipping-Point Trade Recommendations for Cashing In on the 'Protocol 5' Revolution
Avid Technology, Inc.	AVID	11/28/11	$6.94	–	The Four Best Tipping-Point Trade Recommendations for Cashing In on the 'Protocol 5' Revolution

New Growth Investor Portfolio

STOCK NAME	STOCK SYMBOL	ISSUE/ALERT RECOMMENDED	ENTRY PRICE	DIVIDEND YIELD	COMMENTS
ProShares Ultra MSCI Emerging Markets (holding 50%)	EEV	June 17, 2011 Alert	$32.07	–	New strategies for new market dynamics — Buy up to $33.50
Green Dot Corporation	GDOT	August 2011	$36.20	–	Court-ordered profits — Hold
Dunkin' Brands Group	DNKN	September 2011	$28.60	–	Move over, Starbucks — Use a Buy-Stop Order above $28.60
Gannett Co., Inc.	GCI	October 2011	$9.16	2.70%	"Rich Media" — Buy at $9.25 or better
LinkedIn Corporation	LNKD	November 2011	$78.50	–	Network connection — Set initial stop order at $61.20