

# Inventors

SEPTEMBER 2017 Volume 33 Issue 09

DIGEST

SPECIAL SECTION:

## PROTOTYPING

3D SYSTEMS • FASTER PCB PROTOTYPING  
• TOOLS, MATERIALS, PROCESSES  
AND MORE!

Instant Replay

INVENTOR GOT IT RIGHT

Improvement Inventions

KNOW YOUR RIGHTS, OPTIONS

## CANINE CRUSADER

BURT WARD'S MISSION: EXTEND PETS'  
LIVES WITH GENTLE GIANTS DOG FOOD

26  
YEARS  
OLD

20  
YEARS  
OLD

\$5.95

POSTNET STANDARD  
US POSTAGE PAID  
PERMIT 38  
FULTON, MO

# SAY HELLO TO INNOVATION

At Eventys Partners, we build new products, create new brands and breathe new life into existing ones using an efficient, collaborative approach. We believe there are two ways to grow your business: introduce innovative new products or sell more of the products you already have. Whichever approach fits your needs, we can help you thrive with a proven strategy that delivers quantifiable results.

**Put simply, we build new products and then help you market them.**

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# Inventors

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## Inventors Have That Passion in Common



Born in the 1940s on the West Coast, Burt Ward is an effusive innovator who has special skills involving living things and their well-being. Born in the 1980s on the East Coast, Jeremy Losaw is a laid-back innovator who has special skills involving engineering materials and processes.

However, both have an important commonality: a passion for inventing.

Most of you know about Ward, a pop culture icon who rose to stardom via his role on the 1960s TV classic "Batman" as the Caped Crusader's loyal sidekick, Robin. These days, he's innovating to extend and improve dogs' lives through Gentle Giants dog food and the Gentle Giants rescue he founded with his wife, Tracy, 23 years ago. Losaw, meanwhile, has a starring role of his own as engineering manager with Enventys Partners, a Charlotte-based product development company.

Just as he oversees many of Enventys Partners' prototyping and product processes in a hands-on way, Jeremy was a major contributor to this month's special prototyping package. He either authored or originated content for most of the section.

"I have always enjoyed building things and taking them apart," Jeremy says. "The feeling I get when I make a prototype work is a fist-pumping type of feeling, not unlike scoring a goal."

He's savored this thrill for as long as he can remember. "My first interest in prototyping was building model cars with my dad. I used to go to the full-scale drag races, and then at home I would build models of drag cars. I wasn't good at it, would use way too much glue and my paint jobs were fourth-rate, but I loved doing it."

He built a solar water heater out of Plexiglas and beer cans in high school. In college, he used an internship in the machine shop to learn how to use machine tools and make good mechanical prototypes. He spent three years designing and prototyping many different types of parts for the Formula SAE student race car program. In grad school, he made a prototype circulatory system with plastic tubes and balloons.

As a parent, Jeremy loves sharing his knowledge with a new generation. "I make electronic controls for my greenhouse and build electronics projects with my daughter, Harper. We recently made an LED-powered Little Mermaid shell necklace."

More proof that inventors and inventions come in limitless types and possibilities.

—Reid  
(reid.creager@inventorsdigest.com)



Jeremy Losaw, engineering manager with Enventys Partners

# INGENUITY IS AMERICA'S MOST VALUABLE RESOURCE.

**DON'T TREAT IT LIKE A CHEAP COMMODITY.**

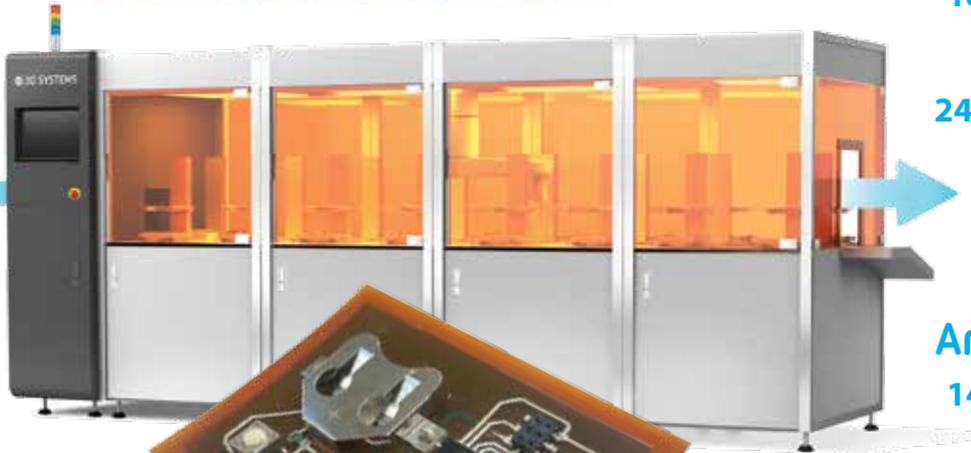
Our strong patent system has kept America the leader in innovation for over 200 years. Efforts to weaken the system will undermine our inventors who rely on patents to protect their intellectual property and fund their research and development. Weaker patents means fewer ideas brought to market, fewer jobs and a weaker economy. We can't maintain our global competitive edge by detouring American innovation.

**SAVE THE  
AMERICAN  
INVENTOR**

**TAKE ACTION AT [SAVETHEINVENTOR.COM](http://SAVETHEINVENTOR.COM)**

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# BRIGHT IDEAS

## Polar Seal

### MULTI-LEVEL HEATED TOP

*Polarseal.me*

The Polar Seal top keeps wearers comfortable with the touch of a button, using two different embedded heating zones.

The top is slim enough to be worn over a shirt and under a jacket, where it heats lower and upper back sections. Both heating zones can be used together or separately, offering three heating modes that are controlled by small buttons on the left sleeve. The Polar Seal's integrated battery pack provides up to eight hours of heat on one charge.

Men's and women's sizes are available in a range of colors. The top is water resistant, though hand washing is recommended.

The Classic version will retail for \$169, with a projected November shipping date.



## Volterman

### SMART WALLET

*Volterman.com*

This versatile wallet boasts five features: a built-in power bank (from 2,000 to 5,000 milliamp Hours); a distance alarm; global GPS tracking; worldwide WiFi hotspot, and thief detection camera—all while being slim and lightweight.

The Bluetooth alarm system notifies you every time you leave your wallet or phone behind. The internet cost with the WiFi hotspot is up to three times cheaper than regular roaming charges. Once your wallet is in Lost mode, Volterman's camera pictures anyone who opens it and sends you the photos.

PCB in all of the wallets is fully sealed with epoxide resin sealant, making them secure and resistant to heavy weights and heating.

The Volterman comes in a bifold (\$238 suggested retail) and travel model (\$314; can also hold passports and boarding passes). Estimated shipping date is November-December.

## Antonia Saint NY

### COMFORTABLE HEELS, FLATS

[bit.ly/AntoniaSaintKS](http://bit.ly/AntoniaSaintKS)

Antonia Saint NY touts essential heels and flats that look classic on the outside and feel like sneakers on the inside, thanks to a trademarked SoftSurround System. The company uses a Fit Profile and Fit Kit to get the wearer's measurements and find your closest matching shoe in order to customize the shoes.

The upper cushion support system is designed to end pain and blisters; the heel tips are said to be so strong that they last five times longer than others. Three widths are available: narrow, standard and wide. And you can order the perfect size for each foot.

The Essential Flat will retail for \$295 (estimated delivery in February), the Essential High Heel (December) for \$365.



“Invention presupposes imagination but should not be confused with it.”

—IGOR STRAVINSKY

## DC-Tri

### STAND-UP E-BIKE

[bit.ly/DCTriKS](http://bit.ly/DCTriKS)

Billed as the first truly universal stand-up e-bike, the DC-Tri is lightweight, does not require pedaling, is highly maneuverable and has a zero-turn radius. It's marketed as a high-quality e-bike, given features such as a powerful Bafang 250-watt, brushless front hub motor; Tektro disc brakes; DNM shock forks; a Phylion 36-volt, 11.6-ampere hour, lithium-ion battery and Intek Zoom Alloys A-Head stem.

Ride using the electric motor (maximum speed: 15 mph) or like a regular scooter, using self-propelled power. The battery can be recharged by any standard power outlet in about 4 hours, and you can travel up to 30 miles on one charge. The backlit LCD screen displays distance, speed, charge level, travel duration and features a USB port, so you can charge your phone and other devices. Choose between five speed levels with the mode controller.

The bike will retail for \$2,100. Rewards shipping begins in November.





# Instant Replay Inventor Got it Right

TONY VERNA SHOULD GET ALL OF THE CREDIT AND NONE OF THE BLAME **BY REID CREAGER**

**L**et's go to the video, Biff, for another look at instant replay 54 years after its invention: As a means of enhancing entertainment for sporting events on TV, it has been a good thing. As far as being used to rule on borderline calls on the field, it has been, well, borderline at best.

When he used instant replay for the first time during a live sports telecast on Dec. 7, 1963, director Tony Verna was simply trying to fill a void in the action to extend the excitement of a scoring play. Late in the annual Army-Navy game, Army quarterback Carl "Rollie" Stichweh scored on a one-yard touchdown run to cut Navy's lead to 21-13, pending the extra point.

Then, to the amazement of the CBS viewing audience, Stichweh immediately scored again. Was the game about to be tied? What happened?

He hadn't scored again; it only seemed like it. "This is not live!" announcer Lindsey Nelson shouted. "Ladies and gentlemen, Army did not score again."

CBS had not mentioned that it would use instant replay on that milestone day, for fear the technology wouldn't work. But using an Ampex tape machine the size of a washer-dryer to rewind the videotape and run it before the next play, Verna found the right spot to unveil the technology that is now a permanent sports fixture. Instant replay not only revisited the drama of a previous play, it

could reveal aspects or details that we hadn't noticed during the original viewing. CBS used the technology a month later for the Cotton Bowl on January 1, when announcer Pat Summerall gave the process its name.

The National Football League—seeing how instant replay could reveal new information about plays—eventually decided to marry it with slow-motion filming (the latter invented in the early 20th century by Austrian priest August Musger) as a way to "resolve" close calls. The NFL adopted a limited instant replay system in 1986; in 1999 it evolved into the current system whereby coaches can challenge a ruling on the field.

By the 1990s, instant relay was used to review calls by officials in football, basketball, hockey and other sports. Major League Baseball joined them in 2014. *Sports Illustrated* called instant replay one of the 20 most significant "tipping points" in sports in the second half of the 20th century.

## Overreaching its utility?

Instant replay's impact on sports cannot be debated. Its usefulness in ruling on plays is highly debatable.

The evolution of instant replay in the NFL has produced many problems, according to *Time* magazine: "A coach who got his two challenges right would get a third. Then it grew further still. All scoring plays were

Above, from left: Tony Verna, a TV producer who unveiled instant replay in 1963, did not intend for the technology to help officiate football games. Now the term "under the hood" is as common for football fans as it is for car lovers.

Opposite page, top: The Ampex tape machine is used during Douglas Edwards' CBS evening news show in 1956.

PHOTOS FROM LEFT: STEPHANIE DIANI; CREATIVE COMMONS; MR. USA/JICC BY 2.0; CBS ARCHIVES



## For better or worse, instant replay went from an entertainment device to a means of deciding borderline calls on the field.

exempted from the challenge cap. Then all turnovers were. If a runner fell to the ground as he was in the process of scoring, or if a ballcarrier lost his handle as he was on the way down, there would assuredly be a review.”

Perhaps the most controversial post-replay ruling in NFL history helped send a team to the Super Bowl after its quarterback trudged off a snowy field, resigned to fumbling the game away and without a hint of protest. In the AFC Championship Game on Jan. 19, 2002, Oakland’s Charles Woodson sacked New England quarterback Tom Brady for an apparent turnover with 1:50 left and the Raiders leading, 13-10. All the Raiders had to do was run out the clock to advance to the Super Bowl.

But after a replay, officials decided to cite an obscure stipulation called the “tuck rule.” They ruled that Brady’s arm was coming forward when he was hit—which made the play an incomplete pass, not a fumble. That enabled the Patriots to kick a tying field goal and win in overtime. New England, not Oakland, went to the Super Bowl, and won it.

### Baseball joins in

A historically bad call by umpire Jim Joyce—ironically, one of the best umpires in the game—is seen as a turning point in MLB opting for instant replay. On June 2, 2010, in Detroit, Tigers pitcher Armando Galarraga was denied a perfect game when Joyce incorrectly ruled a runner safe at first base on a play that wasn’t even close and should have ended the game. MLB went to instant replay less than four years later.

In announcing its decision, MLB thumped its collective chest with a vow to “get it right for the fans.” That noble intent notwithstanding, a likely factor in the rules change was the fact that MLB would not or could not fire umpires who show repeated incompetence and beligerence. Instant replay was the only answer.

The move to instant replay has resulted in some painful changes. Besides the numerous delays while awaiting a decision from an anonymous person watching from hundreds of miles away, instant replay has robbed MLB of badly needed color. Players’ and managers’ arguments with umpires, once part of the game’s fabric, are all but gone; instead, after a questionable call the manager merely turns to a coach to ask whether the play is reviewable.

### Enduring legacy

Don’t blame Tony Verna. “I didn’t invent instant replay to improve officiating, or anything like that,” he was quoted as saying in *Pacific Standard* magazine in 2013. “I invented it for a better telecast.”

Verna’s invention was somewhat bittersweet for himself, too: CBS “never gave me the recognition,” he told the *Los Angeles Times* in 2008. “This wasn’t a mushroom that came out of the ground. There wasn’t a button you could hit. Someone had to come up with it.”

He received no patent or payment for his revolutionary invention. But Verna—who, among other accomplishments, co-produced and co-directed “Live Aid,” the 1985 fundraiser for African famine relief—was satisfied with his place in history when he died two years ago at age 81.

As he told the *Associated Press* many years earlier: “Not many things you can do in life where you can change the way things were happening before.”

## INVENTOR ARCHIVES: September

SEPT. 30, 1452

**Johannes Gutenberg**, inventor of the movable-type printing press, produced a Latin language Bible in Mainz, Germany, that is considered the first mass-produced book ever printed.



The exact date of publication is disputed. Scholars say it was Feb.

23, 1455; other sources, such as [thoughtco.com](http://thoughtco.com), give the date above.

The book revolutionized printing. To that point, all books had to be copied by hand. The two-volume Bible was one of the earliest works that used movable metallic type, a system of individual letters and character pieces that could be rearranged and reused during printing.

In 1987, the Gutenberg Bible sold for \$5.4 million at auction in New York—the highest price for a book to that point.

### Inventor Archives update:

For the latest on the rights to Beatles songs, covered in the August issue, go to [InventorsDigest.com](http://InventorsDigest.com).



### 3 Build out your profile.

No matter what platforms you choose, you'll need a few basic things to fill out your profile. To start, you'll need a profile picture. Generally, this will be your logo. However, if your logo is more complicated in terms of design, you may prefer to use a simplified version such as your mark.

You'll also need to write a short "about" section. On Twitter, your bio section is limited to 160 characters, and Instagram has a limit of 150. Other social networks give you a bit more room to work with, but it's still a good idea to keep this section short and direct people to your website if they want to learn more.

You'll be able to include a link to your website on your social network. Generally, the best practice is to link to your homepage, but if you want to highlight a new product or you have a special promotion running, you can easily use that link instead. Facebook and LinkedIn allow you to add additional information such as location, hours, services offered and more.

### 4 Create an editorial calendar or content posting schedule that will engage with your audience.

Once your profile is ready to go, begin to plan your content. First, think about which types of content you want to post. You can use your social accounts to post product photos, show off specs and features, describe a promotion, share an article, host a contest, highlight a daily hashtag, ask a question and much more. As you're thinking about content to post, consider which types of content fit your brand best—but also which types of content are most likely to resonate with your audience.

After you've narrowed down which types of content to focus on, you can begin to think about when you will post it. Post frequency depends on many factors, including how much time you can devote to social media. Additionally, some social networks require more frequent posts than others; for example, you may plan to tweet something on Twitter five times a day but only post on LinkedIn once a day.

Once you determine the types of content you'd like to focus on initially and how often you'd like to post, begin to craft your content calendar or editorial calendar. Some social media managers prefer to plan every social post in advance; others like to plan the theme of

each post but create the actual post at the same time it is posted. If you choose the former method, you can also go ahead and schedule all of your posts ahead of time.

Facebook allows you to schedule posts right on your page, but some find it easier to use software such as Buffer or Hootsuite to manage all of their content scheduling in one place. Currently, no good option exists for scheduling posts on Instagram because of its API (application programming interface). Most softwares that claim to schedule Instagram posts actually just send the post to your phone at the correct time so that you can post it manually.

### 5 Maintain your accounts and build your following.

Once you have several weeks of posting under your belt, you enter the maintenance stage of social media marketing. Your goal at this point is to continue refining your strategy, looking for new types of content to post and new ways to reach your audience on social media.

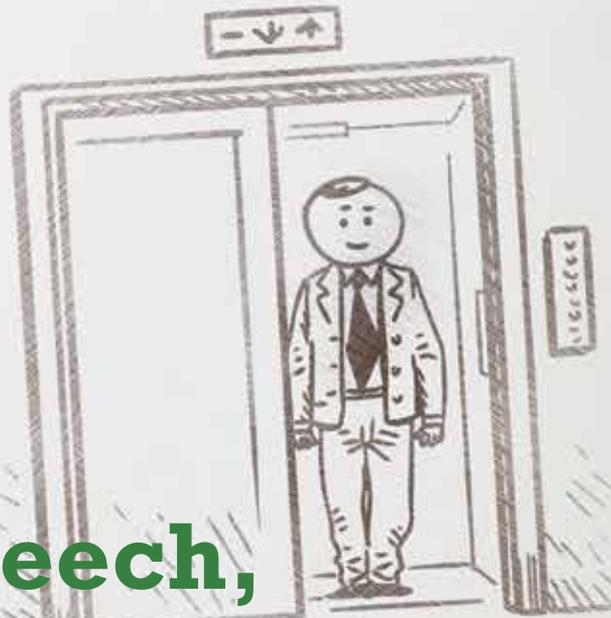
Pay careful attention to your analytics—whether you're looking at native analytics built into the platform or you use an external reporting software—and discern which types of content resonate best with your audience.

Maintenance also includes regularly checking on your accounts to respond to any comments and messages, and to interact with other accounts. Generally, you should check in at least once every business day, but if you have a highly active account, you may need to check in more than once a day and on weekends.

Above all, when promoting your invention on social media it's important to keep a clear and consistent line of communication with your followers. Good use of social media builds trust, and if people feel like they can trust you as a company, they're much more likely to purchase your new invention. 📌

**Elizabeth Breedlove** is content marketing manager at Enventys Partners, a product development, crowdfunding and inbound marketing agency. She has helped start-ups and small businesses launch new products and inventions via social media, blogging, email marketing and more.





# Elevator Speech, or Virtual Prototype?

COMPOSE A SELL-SHEET AFTER YOUR 'EUREKA!' MOMENT, AND BEFORE ANYTHING ELSE **BY JACK LANDER**

**A**sk most inventors what they consider the least fun in the invention cycle, and they'll tell you that pitching their invention is at the top of the list. So, let me attempt to make this process easy and painless.

First, let's discuss the means of connecting with your potential licensee, or your market channel if you intend to produce and sell. By connecting, I don't mean mere contacting. I mean two-way communication.

Understand that brevity is essential. That's the principle of the "elevator speech." You have to imagine that you just stepped into the elevator with the vice president of marketing for the A1 Ladder and Storm Door Corp. You're all primed to pitch your new ladder accessory.

Whether verbal or in writing, the first two things you tell are what the device is and its main benefit to its eventual customer. And you've got to follow through with subordinate benefits—all presented by the time the elevator reaches the ninth floor.

We aren't always able to make a personal pitch. Even when we can, our best pitch is usually made on paper, not verbally. Even when we know all of the benefits of our invention, we find ourselves stumbling, rambling, forgetting and inserting words that don't "sell," and failing to optimize the impact of benefits by presenting them in the wrong order. By presenting our invention on paper, we should evoke questions, and we find ourselves more able to answer coherently than if we attempt to start from scratch.

## Think of the consumer first

What I'm getting at is that we need a "sell-sheet," regardless of how or when we make our pitch. A sell-sheet is our crib, our pony, (or whatever you used to call those sneaky little notes to yourself that you tried to use when you took your history final exam). It presents your story in the clearest possible language, and in the order of most compelling benefits first. We know this because we have edited its content many times and perhaps had expert critiques. (Be suspicious; there are very few experts.)

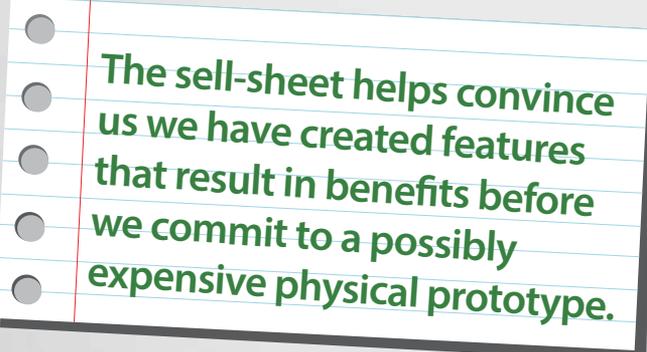
When do you start composing your sell-sheet? The minute after your "Eureka!" moment. Before investing any serious thought in a patent search or a prototype, start your sell-sheet. Begin immediately to convince yourself that your invention serves a purpose, and that purpose means at least one significant benefit to someone other than you.

We inventors tend to think in terms of features, but the ultimate users of our invention think in terms of benefits. So, we must orient our thinking for the purpose of successful pitching to a potential licensee. Even if we plan to produce and market our invention, we need the sell-sheet in order to convince all channels of the marketplace (plus the ultimate user) to distribute, sell and buy.

In addition to clarifying the invention's benefits, an early stage sell-sheet draft helps us to understand our own invention. There's a great saying among writers: "I don't know so well what I think, until I see what I say; and then, I have to say it over again."

This principle applies to inventions as well. We don't know so well what we have invented until we evaluate a prototype, and then we usually have to go back to the sketch pad and make improvements. The sell-sheet helps convince us we have created features that result in benefits before we commit to a possibly expensive physical prototype. In fact, the sell-sheet can act as your virtual prototype in certain situations, such as:

- You don't have the money to create a good working prototype.
- You can't find a prototyper you trust to execute your intention.

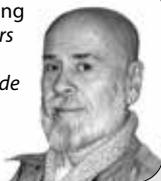


**The sell-sheet helps convince us we have created features that result in benefits before we commit to a possibly expensive physical prototype.**

- Your invention is too large or unwieldy to transport for show and tell.
- You're not yet confident that you have a marketable product, and you want to try out your concept without spending a fortune. (Be cautious here. Disclosure without at least a provisional patent application is dangerous, and most businesses won't sign non-disclosure agreements.)

Having a convincing sell-sheet enables you to get to the point where your prospect agrees to a meeting at which you present your physical prototype. That's your moment of truth. At this point, you have to decide whether to actually make a physical prototype or proceed without it, and hope you can get a commitment based on your sell-sheet alone. ☑

**Jack Lander**, a near legend in the inventing community, has been writing for *Inventors Digest* for 20 years. His latest book is *Marketing Your Invention—A Complete Guide to Licensing, Producing and Selling Your Invention*. You can reach him at [jack@inventor-mentor.com](mailto:jack@inventor-mentor.com).



## IDEAL SELL-SHEET SETUP

Let's look at the ideal composition of the sell-sheet. These are the crucial points, in the order in which they should appear:

**1. The tagline** (headline) should be a maximum of about 12 words. You want this to define what you have invented and brag about its main benefit to the consumer, not to any of the entities in the distribution channel. Example: "The novel grip that helps you move from ladder to roof safely."

**2. The photo or virtual photo** should be on the left side (we read left to right) immediately below the tagline. A 3-by-3-inch color photo or virtual photo should show the 'product' in use if appropriate. Most inventors find that a virtual photo (computer-generated graphic) is more effective because it can be changed inexpensively several times until we get what we want. Professional camera photography is expensive to change.

**3. Bulleted subordinate benefits** should be listed to the right of the photo, in order of most beneficial first. Font, type size and length of sentences or phrases should be adjusted so that you achieve a pleasing visual balance with the photo.

**4. A paragraph or two in narrative form** should explain in more words what you said in a few words in the tagline, along with a few bulleted benefits, located across the width of the page.

**5. Testimonials** should follow below the paragraph(s) above. They hammer home the benefits in a more believable form than the words of a copywriter. The most powerful testimonials come from people who have actually used either a prototype or early product. But in the early stages, you may have to use statements from people who "can't wait to use your product when it is available." Always use real names and cities. Initials convey a made-up testimony from a nonexistent person. You'll find that even strangers are willing to have their full name used.

**6. The last inch at the bottom of your page** should contain contact information. Never call yourself an inventor in this space. Sorry, but business people are suspicious of us. We are, in the end, "new-product developers." Let's say so.

**7. The reverse side** is less formal: helpful diagrams, more photos, frequently answered questions—and with caution, a tragic story of what happened to a do-it-yourselfer who fell from his roof while trying to get back on his ladder without having the benefit of your new safety grip.

**Final caution:** Use only the standard 8-1/2-by-11 paper. Do not fold. A crisp, unfolded sell-sheet is much more inviting than one the reader has to unfold before reading. Every second is dear until the reader's sincere interest is aroused.

To be on the safe side, follow my seven points in your rough layout before you're tempted to get artistic. If you dare, and don't cry easily, send me your semi-final result for a free critique.



# Warm-weather Dress a Hot Commodity

OMNIADRESS INNOVATOR HEADED KICKSTARTER BACKERS' REQUESTS TO CREATE A SEQUEL **BY EDITH G. TOLCHIN**

**I** enjoy it when inventors contact *Inventors Digest* to share success stories. I was fortunate to interview Evelin Evy, creator of the OmniaDress 2GO—an innovative new clothing system that offers the wearer a day-to-evening outfit, all in one. (In Arabic, omnia means “wish”; in Latin, it means “everything.”)

I thought back to the 1970s, when I studied apparel design and often sought new inspiration for my creations. Why didn't I think of this?

**Edith G. Tolchin (EGT):** How did the OmniaDress 2GO come about?

**Evelin Evy (EE):** OmniaDress 2GO is a second generation of our original OmniaDress. After our first campaign, which also was on Kickstarter (raising more than \$30,000 from 300 backers worldwide), and all orders were fulfilled, we conducted a survey among our backers. We wanted to find out what changes and improvements they might like to see in the new generation. It turned out that most of the backers wanted a type of dress that they could wear in hot weather from a lighter fabric. After we received all the answers, we began to work.

**EGT:** Tell us about your experience in apparel.

**EE:** With the OmniaDress 2GO, we formed the OmniaDress family. The first generation was designed for the off-season.

Our team has more than six years of accessories and apparel manufacturing experience for our brand AGE®, which has three successful crowdfunding campaigns with premium accessories like bracelets; wooden bowties; suspenders and two generations of Phonsters—a multifunctional holster for your phone, wallet and other everyday carry “stuff.”

**EGT:** What type of fabric is used for the dress system? How well does it travel and wash?

**EE:** As OmniaDress 2GO is for hot or warm weather, the material is a flexible fabric of a special weave. Elastin (which enters in a small proportion), along with cotton and polyester fibers, create the fabric with a super stretching ability. Also, Omnia 2GO is machine washable, so you can use it again and again. The main specifications of the fabric are that it's super lightweight; stretchy; machine washable, and feels soft and comfortable to the skin.

Omnia 2GO can be packed compactly into a small roll. So it will take just a small space in your travel baggage.



**OmniaDress 2GO, which can be transformed into more than 20 different functional styles, reached its crowdfunding goal in three hours.**



**EGT: How many different styles are created with the one basic dress?**

**EE:** Omnia 2GO can be transformed into more than 20 different functional styles. As fast as your daily plans change, your magic dress will also change, providing a suitable outfit in any situation. We show in our presentation all styles: 10 basic looks to provide you the best Omnia experience and 10 extra outfits. Also, we are very happy when people create their own styles!

**EGT: How many color options are there?**

**EE:** We started our Kickstarter campaign with four colors. But at this time with support and ideas from our backers, we added another five. We are always in touch with our backers and maybe in the near future will replenish our palette with new colors.

Also, the top part of the dress is bicolor. The first color is the basic color of the dress. The second color is an extra color of the inner side. So you can create a monochromatic style or a bicolor style of the dress, depending on your needs.

**EGT: Is the dress one-size-fits-all?**

**EE:** We have a size chart from S to XXL, so Omnia 2GO will perfectly fit women of height between 150 cm (59 inches or 4 feet 11 inches) to 195 cm (76 inches or 6 feet 4 inches). Some of the styles need to be used with leggings if your height is more than 182 cm (71 inches or

5 feet 11 inches). And you can use any convenient style from our “Extra Omnia 2GO outfits” recommendations, or—of course—create your own styles.

**EGT: What is the retail price of the dress?**

**EE:** The regular price of Omnia 2GO is \$89. (A discount of more than 50 percent was available to Early Bird backers on its Kickstarter campaign, which reached its \$3,000 funding goal in three hours and ended at \$47,642 from 589 backers.)

**EGT: Tell us about your quick funding on Kickstarter.**

**EE:** This was made possible by our backers. We thank our backers so much for pledging their support and for believing in our project. Without them, it would be impossible. So we are very happy with our Omnia Dress community, and it shows us that we are following the right steps.

**EGT: Are you planning on selling just from your website, or will you sell to retail as well?**

**EE:** Omnia 2GO is sold from our website, [omniadress.com](http://omniadress.com) (shipping was tentatively set to begin as early as July 31). We are negotiating with some stores that have expressed a desire to sell Omnia 2GO. If someone also wants to join our community, we are open to negotiations.

Evelin Evy says support from backers increased the number of dress colors from four to nine.



Omnia 2GO is currently sold through the website, though negotiations are under way with stores.

**EGT:** Are you manufacturing in the United States, or overseas?

**EE:** Our legal entity is situated in New York, but our manufactory is in Odessa, Ukraine. We create and work with our manufactory, who has helped us during all our five Kickstarter projects. Our manufactory has already produced three small runs of our Omnia 2GO and has done significant testing. All of our lucky friends and families that have tried Omnia dresses agree that Omnia is the simplest and most comfortable solution for daily activity. At full load, we have the ability to produce 500 Omnia dresses per month.

**EGT:** Is the product patented? If so, tell us about that process.

**EE:** Patenting is an important point for a start-up. Omnia 2GO will take a course on patenting. We are working on it because your idea must be yours and everything must be done legally.



**EGT:** What challenges have you encountered?

**EE:** We are faced with the happiness and satisfaction of our backers from the first-generation dress and their desire to receive the new (summer) generation dress. So, we are working hard to create the Omnia 2GO.

**EGT:** Do you have any messages for readers?

**EE:** We invite readers to see our campaign and hope you enjoy it. Also, please write your comments and private messages to us, where you can give your ideas about what you want to see in Omnia—or what you miss, and so on. We are open for dialogue. ☺

*Details: omniadress.com*

**Edie Tolchin** has contributed to *Inventors Digest* since 2000. She is the author of *Secrets of Successful Inventing* and owner of EGT Global Trading, which for more than 25 years has helped inventors with product safety issues, sourcing and China manufacturing. Contact Edie at [egt@egtglobaltrading.com](mailto:egt@egtglobaltrading.com).



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# HERE'S TO FAITHFUL SIDEKICKS

LONGER, QUALITY LIVES FOR DOGS IS THE PASSION BEHIND BURT WARD'S GENTLE GIANTS **BY REID CREAGER**

**P**op culture history is littered with fallen Hollywood stars. Since rocketing to stardom as Robin on the iconic mid-Sixties TV show “Batman,” Burt Ward has gone to the dogs—but in a remarkably inspirational and unselfish way.

Ward and his wife, Tracy Posner Ward, have saved the lives of more than 15,500 dogs via their Gentle Giants Rescue that they founded in Norco, California, in 1994. All of those dogs have lived in their home until they were adopted. Often devastated by the pain of seeing some of those larger dogs die at age 5 or 6, they turned to the innovation arena to help all dogs live longer, healthier lives with all-natural, low-fat, heart-healthy Gentle Giants dog food, sold nationally with no profit for them.

“Gentle Giants dog food is excellent for all dogs of all ages, sizes, and stages of life,” Ward says. Burt and Tracy have fed it to dogs from 3 lbs. to 300 lbs., from 4-week-old puppies to seniors that are 27, healthy and active.

Ward says the food—in combination with the Gentle Giants feeding and care program—can double the lifespan of dogs and sometimes triple the lifespan of bigger dogs, which typically live six to nine years.

“Suppose a restaurant opened up where you live,” he says, “and at this restaurant everyone who ate there could live 200 years and be totally healthy. How hard would it be to get a seat at that restaurant?”

“We invented something that changes, lengthens, and improves the lives of dogs. Life is the most valuable and precious commodity in the world.”

## A scientific, loving formula

Gentle Giants dog food—U.S. trademark serial No. 77255248, registration date Jan. 6, 2009—was not a hastily conceived product. The Wards had nutritionists from across the United States develop their unique formula. The couple fed the dog food to the thousands of dogs in their rescue for years and saw great results before making it commercially available in 2008.

Burt Ward said their pursuit of the highest standards included “spending some time finding the most prominent patent and trademark attorneys, then the time for providing detailed information to the attorneys prior to their filing, then determining which classes that we want to seek registration for, filing and waiting ... waiting ... waiting ... finally getting the registration and maintaining the records as to when to file renewals, etc.”

Now Gentle Giants is available nationally online from Walmart.com, Chewy.com and PetSmart.com, and is sold in 1,200 stores in California as well as thousands of stores throughout the country.

Most dog foods have 12 percent to 22 percent crude fat, Ward says, but Gentle Giants has only 9 percent. Made in the USA, the dog food has natural, super-premium ingredients that include farm-raised chicken, 12 non-genetically modified organism vegetables, three non-GMO fruits, complete vitamins, chelated minerals, glucosamine, chondroitin, prebiotics and probiotics.

Ward may be most proud of what the dog food doesn't have: No added fat, No excessive protein, No meat or poultry by-products, No fillers, No artificial colorants.

Burt Ward shows off his “canine kids” on the facing page: Tara (left), 26 years and 8 months old as of August; and Madonna (right), 20 years and 5 months old. Both dogs, which are fed Gentle Giants dog food and are on Gentle Giants' feeding and care program, are healthy, energetic and living double to triple their normal lifespan of 6-9 years.



PHOTOS COURTESY OF BURT WARD

You can see some of the active dogs shown above, many of which have far exceeded their normal lifespans, at [gentlegiantsproducts.com](http://gentlegiantsproducts.com). The website also shows how the dogs are fed and how the dog food is manufactured. Upper right: Burt Ward, his wife, Tracy, and some of their large-breed dogs. At right: Gentle Giants dog food.

**“When people feed their dogs our food and follow our feeding and care program, we get letters telling us that after four to five weeks, they have a completely different dog, amazingly healthier and happier.” —BURT WARD**

No artificial preservatives. No non-specific animal source ‘meat’ or ‘poultry’ meat, meal or fat. No grain ‘mill run’ or non-specific grain source. No ground corn, whole grain corn or corn gluten. No wheat or wheat gluten. No ingredients imported from China.

“Our program of longevity and age management for dogs is all science,” Ward says. The food is designed to go hand-in-hand with Gentle Giants’ feeding and care program—a hallmark of 23 years’ experience rescuing and caring for dogs, and a lifetime of working with dogs.

The Wards feed their dogs five or more times a day—smaller, more frequent meals—on elevated feeders with their food and water easily accessible, without the stress of the dogs continually having to lean down to eat and drink. This is designed to reduce the added stress of digesting large quantities of food at a single time and to avoid bloat and torsion, a major killer of dogs.

Under the Gentle Giants feeding and care program, dogs are taught to self-regulate how much they eat so they only eat what they need, do not overeat, and never gain too much weight. The food is also designed for

greater absorption into each dog’s body to maximize nutrition while minimizing the volume of food in its stomach at any given time.

Ward says, “If you went to see your medical doctor for an annual exam and asked your doctor the following question: ‘Am I better off eating one or two big meals a day or four or five smaller meals a day?’ What do you think your doctor would say?”

Given that the latter choice is the most healthy, “people say, ‘Well, yeah, but that applies to human beings.’ I say, ‘Wait a minute. A dog is a living creature, and a dog is not nearly as well designed as a human being. That’s why we live so much longer than dogs.’ So, it’s actually much more important for a dog to eat five or more times a day than it is for a person.”

### Beyond the food

As important as healthful, quality food is, Ward says it’s just as crucial for dog owners to understand the many physical and emotional components involved in maximizing a pet’s quality of life and age management,

which significantly affect a dog's longevity. He urges pet owners to read and follow the feeding and care program detailed at [gentlegiantsdogfood.com](http://gentlegiantsdogfood.com).

"When people feed their dogs Gentle Giants and follow our feeding and care program, we get letters telling us that after four to five weeks they have a completely different dog, amazingly healthier and happier," he says. "There is usually a huge, overall improvement in a dog's health, including overall alertness. Other manufacturers add fat to their dog food to make dogs hungrier so you will feed them more food and be forced to buy more dog food, all at the expense of your dog's health. Some manufacturers add protein to their dog food—not because it is necessary or good for dogs, which it isn't, but because customers can be misled by this marketing technique to believe that more protein is better for dogs when it is the exact opposite."

In younger dogs, Ward says, Gentle Giants prevents and corrects developmental issues caused by too much protein in other dog foods. In older dogs, his food's balanced protein helps them move and play without the pain also caused by excess protein in other foods. He says older dogs act like puppies after a consistent diet of the food, staying active and healthy as long as age 27.

The Wards typically shelter 45 to 50 dogs at a time. "Right now we have 24 of the dogs that we have here that have already lived more than twice their normal lifespan. That is consistency. That is not an anomaly."

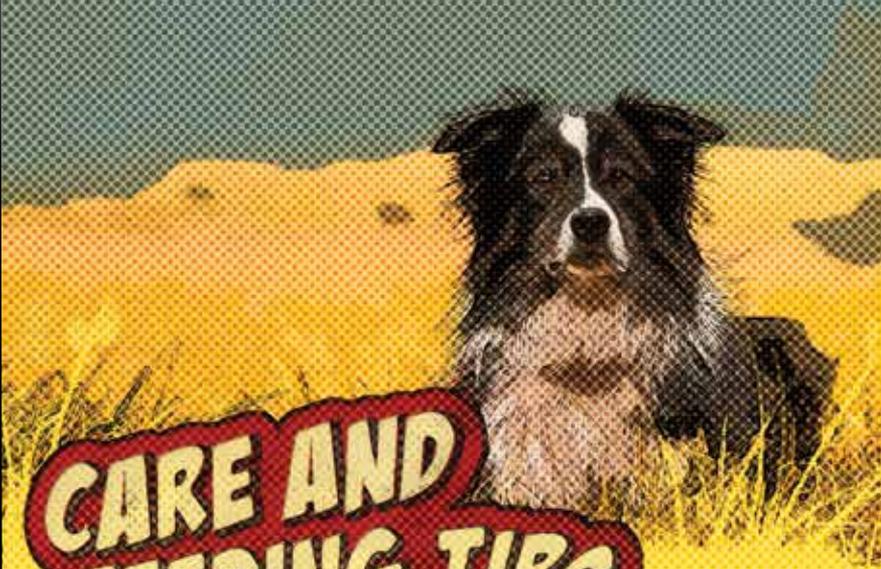
### **'Just a couple weeks'**

All sales from the dog food go to produce more dog food, which the Wards sell only slightly above cost so that it is affordable for as many people as possible. They take no salary and make no money from the sales of dog food, or from the rescue—a California nonprofit 501(c)(3) public benefit corporation that Ward says is the largest giant-breed dog rescue in the world.

This is especially significant when considering the expenses of a rescue that houses breeds such as Great Danes, greyhounds, Mastiffs, and St. Bernards. Ward confirmed that the dogs consume roughly 600 lbs. of food each day costing about \$14,000 a month, and their annual veterinary expenses can be \$50,000 or more.

Burt and his wife feel fortunate they can shoulder such an economic load. Ward notes that he has made personal appearances for decades at which fans buy autographs and have their photo taken with him, the proceeds of which are used to help care for the rescue dogs. He has also run companies. When he met his future wife in 1989, she and her late father, industrialist and philanthropist Victor Posner, owned and operated about 3,600 companies with annual sales of \$26 billion.

Their love of animals was a commonality from the start. "When my wife and I started rescuing Great Danes 23 years ago, the person who had been rescuing them had passed away. Dogs that people had to give up

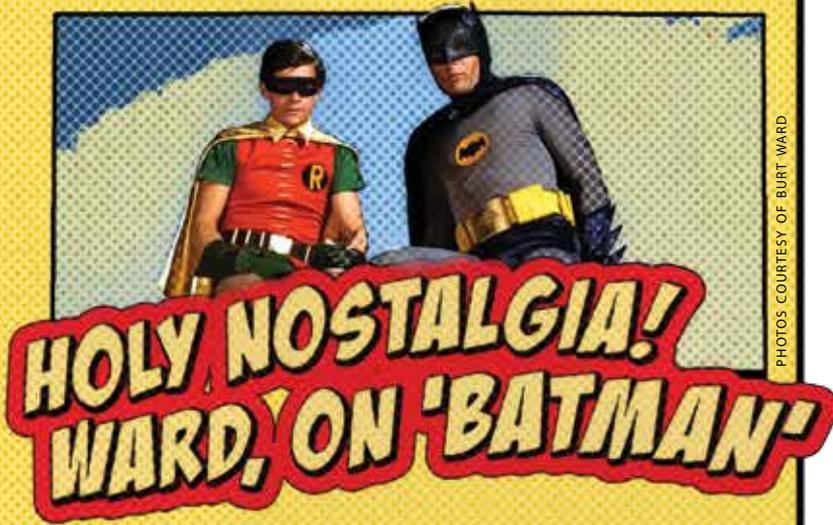


## **CARE AND FEEDING TIPS**

### **Among the suggestions at [GentleGiantsRescue.com](http://GentleGiantsRescue.com):**

- Only feed your dog Gentle Giants dog food.
- Never feed your dog a food that has more than 22 percent protein or more than 9 percent fat.
- Never feed your dog any food that has a greasy feel on the outside.
- Feed Gentle Giants dog food dry. Do not add water. It is recommended to add one heaping tsp. of Gentle Giants canned food at each meal for extra nutrition and taste.
- Elevate food and water bowls at a height so that dogs don't have to lean down to eat, but just tilt their heads down. This can help avoid bloat and torsion, a major killer of dogs.
- A month after transitioning your dog to Gentle Giants, you can increase the amount of dog food that you offer him or her at each feeding to reach a point where your dog will walk away from the food. Gentle Giants is designed for dogs to self-regulate how much they eat. With other dog foods, you need to limit how much your dog eats—so you never know whether you are feeding your dog too little, the right amount, or too much.
- Feed the dog Gentle Giants for 10 to 15 minutes, then remove the food.
- If dogs have any stress or exercise with food in their stomach, they can bloat and die. Gentle Giants dog food is designed to reduce the risk of bloat and torsion.
- Make sure there is no stress or exercise at the times that your dog eats. Do not allow your dog to exercise for at least one hour before and for one hour after each feeding, and feed no food for at least one hour before and after riding in a vehicle.
- Remove the overall stress in your dog's life by fulfilling your dog's emotional needs. Have them live inside your home in the main living area as a member of your family.





PHOTOS COURTESY OF BURT WARD

**Burt Ward is still in demand as Robin.** Last fall, he, Adam West and Julie Newmar (the original Catwoman) reunited to provide voices for an animated feature, "Batman: Return of the Caped Crusaders." Some of Ward's memories involving the TV show that ran from 1966 to 1968:

**What are your fondest memories of Adam West (the original Batman who died June 9 at 88)?**

"I met him 10 minutes before we were going to have a screen test together. Eleven hundred young actors were considered for the role. After five minutes of talking with him, we were both laughing and realized we had a lot in common. We shared a similar kind of humor and became instant friends. We laughed for more than 50 years since then.

"Losing Adam was a terrible loss, completely unexpected. But, I know he spent his whole life making people happy and entertaining people. I encourage people to look at the positive things in life, taking into account that we all have a very short time on this planet, and we should make each day as productive as possible. That's what he would have wanted for us—not to be sad.

"Thinking of Adam always makes me smile. Though other actors have played the role of Batman in feature films, Adam West will always be the best Batman. He was truly the Bright Knight and the one and only true Batman."

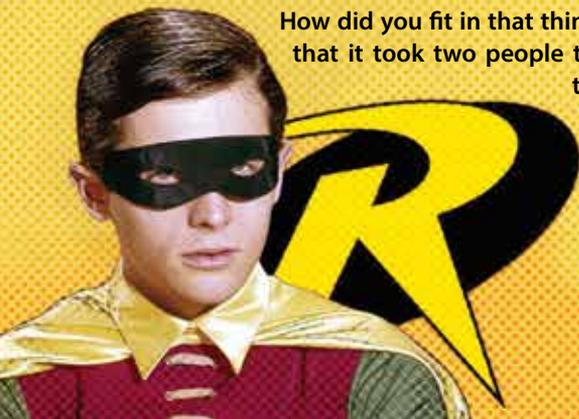
**Because a lot of your face was visible while playing Robin, you had to do many of your own stunts. Is it true you broke your nose while filming the first episode when a 2-by-4 fell on your face?**

"I was in the hospital four out of the first six days of filming: second-degree burns, broken nose... that would be another whole interview.

"There was a lot of stuff that went on there. It was a dangerous show to make--and not the most comfortable costume in the world."

**How did you fit in that thing? You indicated earlier that it took two people to fit you with that costume (worn twice a week for 120 episodes).**

(Quietly.) "Horrible. Take it from me. Man is not built for tights. To the Batmobile, citizen!"



were going into shelters, where there's a lot of barking and dogs are under stress. When you see a big dog like a Great Dane in a cage and it's barking, nobody wants to take it out. In today's world, if they don't take it out within a few days and adopt it, it gets put to sleep."

When the Wards started their rescue, shelters were just a place for people to find lost dogs; owner-turned-in dogs could be put to sleep as soon as the owner who turned them in left. Even today, an owner turn-in can be put down after 24 hours of being in a shelter. Although shelters today try hard to get dogs adopted, they are only required to hold owner turn-ins for 24 hours in case the owner might change his or her mind.

"I said to my wife in the first week of August 1994, 'We can't let these dogs die. We've got to do something. How about we rescue these dogs for just a couple weeks? I'm sure that in a couple weeks we'll find somebody else to take this over.'

"Well, it's been 23 years, and we haven't found anybody else to take over the rescue. I tell people that I need someone to come rescue me."

**Every difference matters**

Ward notes that the American Kennel Club counts 164 breeds of dogs; he and his wife rescue 45, or about one-third of all breeds. "I tell people that my wife has redefined the term 'Great Dane' to mean that if it has four legs and a tail, it must be a Great Dane."

Ward's wife, Tracy, points out that in addition to rescuing four-legged dogs, they have also rescued three-legged dogs and mixes of all 45 breeds they rescue. "We are saving lives. All lives are special, and all deserve to live the longest, healthiest, happiest lives possible."

For them, Responsible Dog Ownership Month—observed every September to educate the public about responsible dog ownership and to celebrate the deep bond between humans and their canine companions—is an everyday occasion. Tracy, once appointed as a vice president, assistant treasurer and assistant secretary to a large conglomerate with thousands of corporations, says she regrets not being able to save all abandoned dogs. She tells this story to illustrate the importance of helping the world in any way possible.

"There's a guy walking down the beach, and he comes upon a site where a million starfish have washed up on the beach. He's watching this little boy, running back and forth, throwing back one or two into the ocean at a time, trying his best to save as many as he can.

"He says to the little boy, 'What are you doing?' The boy says, 'I'm saving lives.' But the man says, 'Why are you bothering? There's no way to save them all. What difference does it make?'

"The boy holds out one starfish, raises it over his head and says, 'It makes a difference to this one.'" 🐾

*On Facebook: Gentle Giants Dog Food & Products*



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# SHARPING HISTORY

## HOW 3D SYSTEMS CHANGED PROTOTYPING FOREVER WITH THE 3D PRINTER **BY REID CREAGER**

**3D printing** or stereolithography is defined as “the action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession.”

Since Chuck Hull invented the process in 1983 and founded 3D Systems in 1986—leading to his induction into the National Inventors Hall of Fame in 2014—the impacts of that technology on industry and consumers are multi-layered as well. 3D printing is often associated with plastics but is also effective in metals, where it has essential uses in medical devices as well as the aerospace and automotive arenas.

Patrick Dunne, 3D Systems vice president for advanced application development, spoke with *Inventors Digest* editor Reid Creager about 3D printing’s evolution and the company’s continuing role in prototyping innovation.

**Reid Creager:** What has been 3D printing’s biggest impact in the inventing process?

**Patrick Dunne:** Before 3D printing was invented by Chuck Hull, there was product development, there was industrial design. These things had existed for thousands of years. People had been cumulatively making things, whether chipping away at a piece of flint or carving a piece of antler, making objects, tools and weapons.

Before 3D printing, in product design if you had an idea you would take your sketches to a model maker. The model maker would take some blue foam or something else and start cutting, carving, gluing, assembling and typically it would take perhaps two or three weeks to get back a prototype—a model that was representative of your idea. Then you would look at your model, have a review, have a meeting, see opportunities for improvement or change, then a few weeks later you

Above: 3D-printed automotive body parts are built using Selective Laser Sintering—a process using layered powder and lasers—and are pulled from the powder once complete. These parts are air vents for Jay Leno’s EcoJet race car.

PHOTOS COURTESY OF 3D SYSTEMS

would have a new physical model. If you think about that process of innovation and iteration, it's a very long cycle. Over the course of a product development project lasting six months, you might go through four or five iterations before you go to market.

With 3D printing, you have an idea and can get a perfect representation of that idea in plastic within hours. I have a design background, and when I started interacting with 3D printing it was like putting accelerant on the iterative design process. So instead of having one iteration over the course of two or three weeks, you could have 20. The more iteration and evolution that goes into design between your initial concept and the time you prototype and go to market, the more generations you put between those two points and the more evolved and optimized your design is.

The fundamental, very high-level impact of 3D is, it essentially enables better design than ever before.

**RC:** And better design is often the result of more experimentation, which is facilitated by a faster mechanical process.

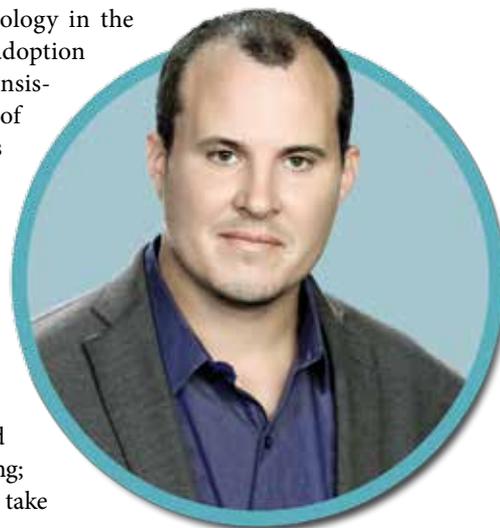
**PD:** Yes. There's a great quote from Pat Warner, an engineer with the Renault Sport Formula One racing team in the UK. He brought in the first 3D printers for iterating on the wind tunnels for the Formula One car. They were running a 15-minute test maybe once every two or three weeks, but after they brought 3D printing in, they were doing a test two or three times a week. He said he loves 3D printing because it allows him to make mistakes faster than ever before.

The high-frequency signal response means that you plot more, you iterate more, you try more. If you think about it, the process of optimizing a design is really just a process of making mistakes, learning from mistakes—taking corrective action, solving a mistake, then moving on and trying again. That's the cycle of design iteration. The more iterating you do, the better the outcome.

**RC:** The utilization of 3D printers by the general public is a relatively new phenomenon. When did that begin catching on?

**PD:** There is an industrial adoption, and there's a consumer adoption. The industrial adoption has been pretty steady since Chuck Hull at 3D Systems invented the technology in the 1980s. If you look at that adoption curve, it has been pretty consistent; there were a couple of accelerations in the 1990s when new, tougher, more accurate materials came on board. Primarily, rapid prototyping because of the speed we just discussed was the primary driver. Toward the end of the 1990s we started to see some companies realize that they could do more than just prototyping; in some instances, they could take

Below: Patrick Dunne, 3D Systems vice president for advanced application development, says the Figure 4 SLA production platform (bottom of page) "integrates pretty traditional 3D technology into automation lines."



## In 1998, all hearing aids were made by hand. By 2004, about 95 percent of all hearing aids in the United States were made by 3D printers.

that plastic part and send it to a foundry and get a steel part, a titanium part, an aluminum part. So we saw these benefits for enabling the production workflow.

We also saw in the late 1990s some changes in the manufacturing workflows like hearing aids. In 1998, all hearing aids were made by hand. By 2004, about 95 percent of all hearing aids in the United States were made by 3D printers. It was quite an analog to digital transition.

This was a convergence of many technologies, not just 3D printing. Scanning technology and CAD software crossed a certain threshold of capability. 3D printers themselves got to a point where the quality was sufficient to address the requirements of a hearing aid. The chemistry crossed a certain threshold where materials became available that could run on 3D printers that were biocompatible. It was 25 to 30 years of behind-the-scenes industrial adoption that not many people know about, but it was all around them whether it was the shape of the car they drove or the hearing aid they purchased.

The last five years have seen the emergence of consumer-level 3D printing. These are the separate-shape, plastic extruder printers that are, from a capability perspective, more of a novelty factor than a highly capable production technology. What was very beneficial from the emergence of these printers is that six years ago, when a bunch of engineers were sitting around a desk trying to solve a problem, it was quite rare that someone would mention 3D printing. Now, one of the first things that comes up is, "Why not use 3D printing?"

**RC: What kinds of price drops have we seen with 3D printers in recent years?**

**PD:** It's pretty dramatic. You can buy novelty printers, little toy printers, for

\$100. Five years ago, the lowest-cost printer was maybe about \$30,000 and the most expensive was around \$500,000 to \$600,000.

Now you have printers at the industrial end that are \$1.5 million to \$2 million. You can see how the spectrum has broadened out. There's not just a bigger range of price but a bigger range of capabilities.

**RC: Building on 3D Systems' pioneering role in 3D printing is the Figure 4 SLA production platform (some of it still in the works), which integrates automation throughout the process. How does this work?**

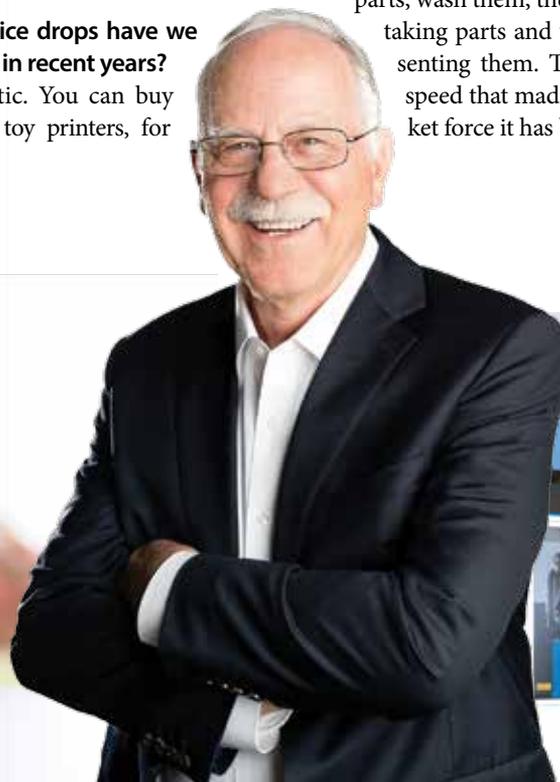
**PD:** The basic concept is, we developed a high-speed, bot (web robot) plastic printer. When we switched one of those machines on, we were getting one object produced every 15 minutes. The engineer who was running it came back upstairs two or three hours later and announced he had run out of gloves.

That was the moment where we realized that as you make this technology faster and faster, the bottleneck ends up moving downstream. The process of cleaning parts traditionally has always been the back end in the 3D printing process—washing the part, cleaning it, curing it. When you make a printer that runs 10 times faster, it becomes more difficult to interact with that technology using human labor.

Figure 4 integrates pretty traditional 3D technology into automation lines—such that, instead of having to have a whole bunch of labor at the end trying to catch parts, wash them, the robotics play a significant role in taking parts and washing them, curing them, presenting them. This is the kind of efficiency and speed that made the original 3D printer the market force it has become. 🤖

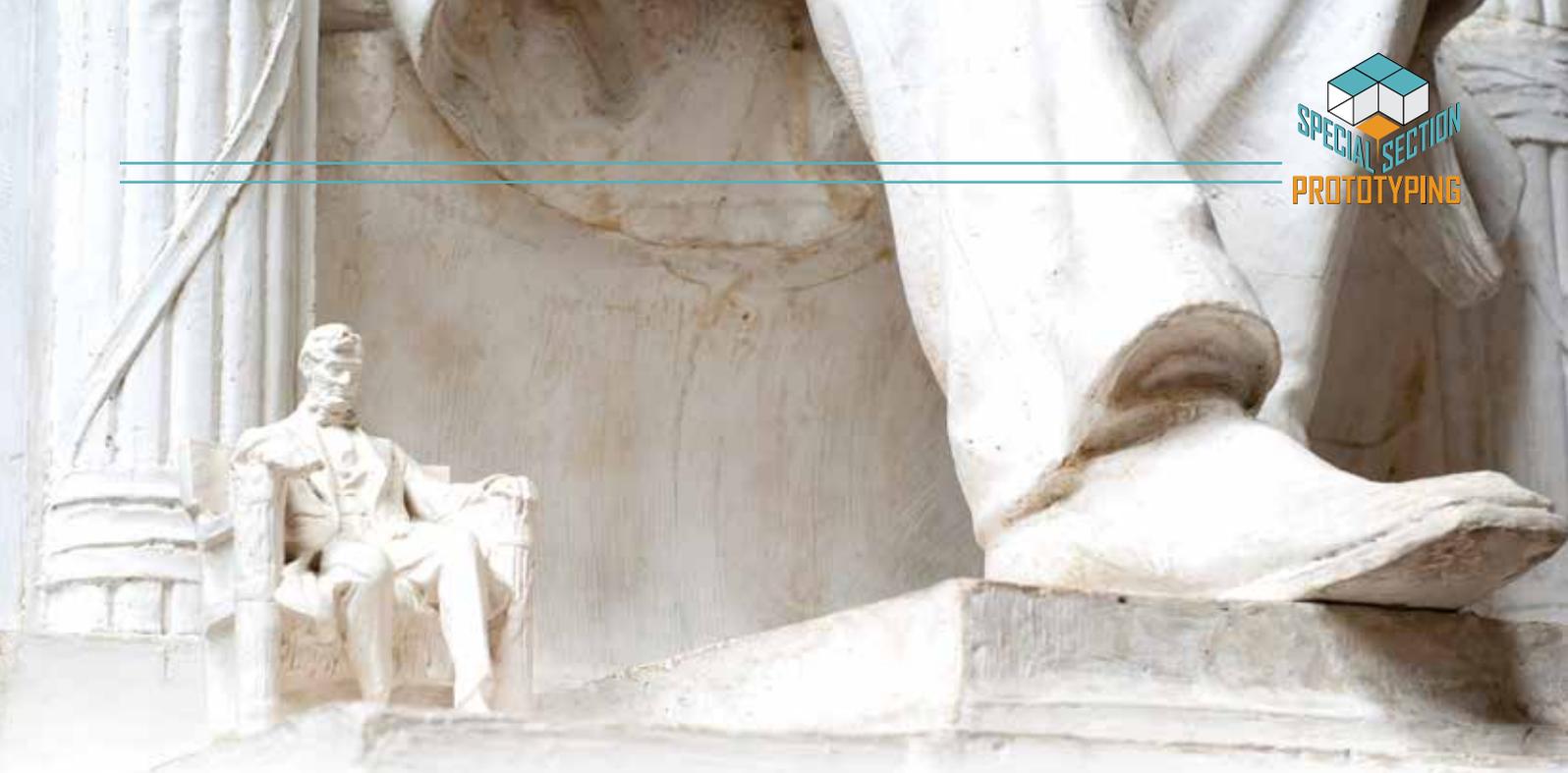
3D Systems founder Chuck Hull stands next to a metal 3D-printed conformally cooled injection molding core—printed in stainless steel—alongside a clear plastic 3D-printed SLA prototype to show the conformal channels.

Far right: Bob Sims (left), immediate past president of the American Society of Mechanical Engineers, presents the ASME Historic Mechanical Engineering Landmark to Hull in front of the SLA-1 printer at 3D Systems' headquarters in Rock Hill, S.C.



URING THE FUTURE





An early study for the Lincoln Memorial (about 6 inches tall) sits in front of the larger study.

# HISTORY LESSON

## for a Young Girl— and Her Dad

VISITS TO LINCOLN MEMORIAL, CHESTERWOOD MUSEUM SHOW HOW PROTOTYPING OVERLAPS DIFFERENT ERAS **BY JEREMY LOSAW**

**A**s a father, I believe it is my duty to ruin vacations for my kids. A day on the beach is no fun; we must visit the botanical garden and learn the names of all the plants. Sleep in and go to the hotel pool? Not a chance. Get your pants on so we can visit ruins and learn some history.

Each summer, I drag my kids 800 miles north to Massachusetts to visit my parents for a few days of family fun crammed full of cultural experiences. We normally drive the 13 hours straight through from North Carolina, but when I found myself with a 3D print of Abraham Lincoln I figured I would take my 5-year-old daughter, Harper, to Washington, D.C. We found that some of the same tools we have to make prototypes in the Enventys Partners shop were used in their analog form to create one of the most recognizable sculptures on Earth.

### Giving back

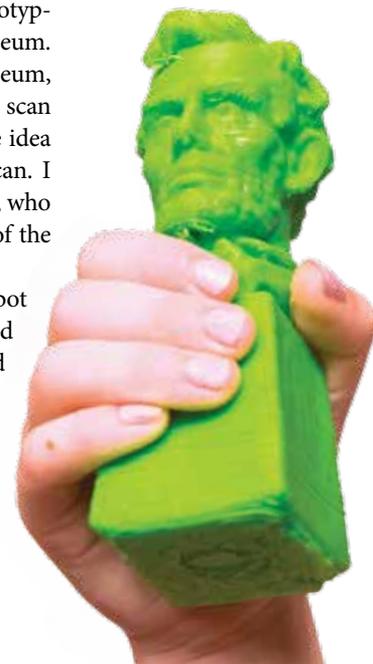
During my summer breaks in college I worked at a museum in Stockbridge, Massachusetts, called Chesterwood—a beautiful estate that was the summer home and studio of Daniel Chester French (1850-1931).

Perhaps best known as the sculptor of the Lincoln Memorial, French was one of the greatest and most prolific realist American sculptors. Though it has been more than a decade since I mowed lawns and cleaned bathrooms at the museum, I still have a great love of the place and for French's work.

I have wanted to find some way to use my prototyping superpowers to give back and help the museum. So last year I met with the director of the museum, Donna Hassler, and told her I wanted to do a 3D scan and print of one of the sculptures. She loved the idea and gave me a reproduction Lincoln bust to scan. I gave the bust to one of my Union College interns, who used their Faro 3D scanner to get me a 3D file of the old man.

Once I got the scan, I printed it on my Printbot 3D printer. I showed Harper; she was as impressed as a 5-year-old could be about a 150-year-old dead president. Then it occurred to me that Harper has never lived a memorable day in her life where she could not ask her dad to 3D print something for her. The Lincoln print was of no greater value than the Jake and the Never Land Pirates gold

Lincoln, meet Lincoln: Jeremy Losaw's 3D print meets its father.



doubloons I printed for her. I wanted to give her some perspective that the Lincoln print was part of something bigger than the printer from which it was made.

### A long, fruitful walk

When we got to D.C., I wanted to do at least one kid-friendly activity, so we spent the morning at the National Zoo. After lunch it was time for the torture, and we headed to the National Mall. We got off the Metro and started the mile-and-a-half walk to the Lincoln. (Pro tip: Long walks in the summer sun are a surefire way to wreck a family vacation.)

When we passed the Washington Monument, I stopped on the grass and took out a penny. I showed Harper the tails side of the coin and explained to her that the building on the coin was where we were headed. The fact that they were the same size if you blurred

your eyes tells you how much farther we had to walk.

We continued onward; I carried her most of the way. When we finally got there, she finally appreciated how massive the memorial is and how many people were there to see it. I took the 3D print from my pocket to show her how ours was a prototype of the real thing. After soaking it all in for a few minutes and getting the photos that I wanted, we left the memorial and headed back—stopping at the World War II memorial to dip our feet in the fountain. In the early afternoon, we jumped in the car and drove the rest of the way to Massachusetts.

### Old-time prototyping

I gave her a couple of days off from the history lessons before spending a delightful afternoon at Chesterwood to see the process of how the Lincoln Memorial was created. Daniel Chester French was known to be a very technical sculptor. He spent a year at Massachusetts Institute of Technology as a young man, and his dad

Harper Losaw stands outside Chesterwood studio.

Inset: Tails! We still have another mile to walk.



**The museum revealed that Daniel Chester French had analog versions of some of the same tools that engineers and designers use in product development today.**



was an engineer who invented the French drain. I brought along our Lincoln 3D print, wondering as we perused the museum what French would have thought about my reproduction of his masterpiece.

The museum revealed that French had analog versions of some of the same tools that engineers and designers use in product development today. In the main part of the gallery was one of the few plaster casts that was pulled directly from Lincoln's face—an 1800s version of my 3D scan CAD (computer-aided design) file. His "3D printer" was his series of scrapers, other hand tools and molds he made with plaster.

French would start his works by making small models and make progressively bigger iterations, slowly scaling them up until they were ready to be carved from stone. When I want to scale a file to 3D print, I just use click a button in the software. French had to use a big lever called a pantograph to maintain his dimensions.

We continued our tour to French's Italian villa-inspired studio. On the side is a curious set of train tracks that go just a few feet before stopping. This innovation allowed French to wheel his larger works into the daylight to study how light and shadow fell on his pieces.

Modern-day designers use rendering software such as Keyshot to apply different lighting conditions to our CAD models and see how they will look in different environments. It was amazing to see Chesterwood again through the lens of time and overlay my experiences as a product engineer to see just how much overlap there is between the needs of a modern-day design firm and century-old master sculptor.

Harper hung with me for the hours that I subjected her to the history lessons and my famous over-explanations. I wanted to give her some perspective and show her the scale and importance of the Lincoln Memorial—and more important, that great work is more involved than the few hours it took to 3D-print our travel mascot. Who knows if she will remember any of our trip, but if she dreads our next vacation I know I will have done my job well. Just wait to see what I have planned when we visit the Louvre someday. 📷

You can see more of my #lincolndiaries on Instagram: [www.instagram.com/jlosaw](http://www.instagram.com/jlosaw)

**Jeremy Losaw** is a freelance writer and engineering manager for Enventys. He was the 1994 Searles Middle School Geography Bee Champion. He blogs at [blog.edisonnation.com/category/prototyping/](http://blog.edisonnation.com/category/prototyping/).



Above: The reproduction of French's Lincoln bust with the FARO scanner at Union College (right) towers over Jeremy Losaw's 3D print.

Below: The Chesterwood studio is a grand showcase of experimentation and design.



# PCB PROTOTYPING Gets Up to Speed

SQUINK ADDRESSES LONGSTANDING ABSENCE  
IN MARKETPLACE **BY JEREMY LOSAW**

Carlos Ospina and his BotFactory team developed the Squink Multi-layer PCB Printer.

**W**hile studying computer science and electrical engineering, Carlos Ospina realized a curious void where logic seemed to short-circuit.

Despite all of the advances in desktop manufacturing to help prototype physical products, he always found it difficult to make prototype circuits. Ospina started his studies in his native Columbia, where it was particularly hard to get printed circuit boards made quickly and economically. He came to the United States to get a master's degree in electrical engineering at New York University and figured it had to be easier.

But it was still problematic. Only one of the eight teams in his master's program was able to finish its capstone projects due to issues with getting circuits prototyped quickly. He knew there had to be a faster way to get boards.

"There were 3D printers to help make fast prototypes of physical components, and I wondered why there was nothing like that for electronics," Ospina said.

Now, there is. Ospina and his team at BotFactory in Long Island City, New York, have developed a desktop circuit printer and assembler called the Squink to speed up PCB prototyping.

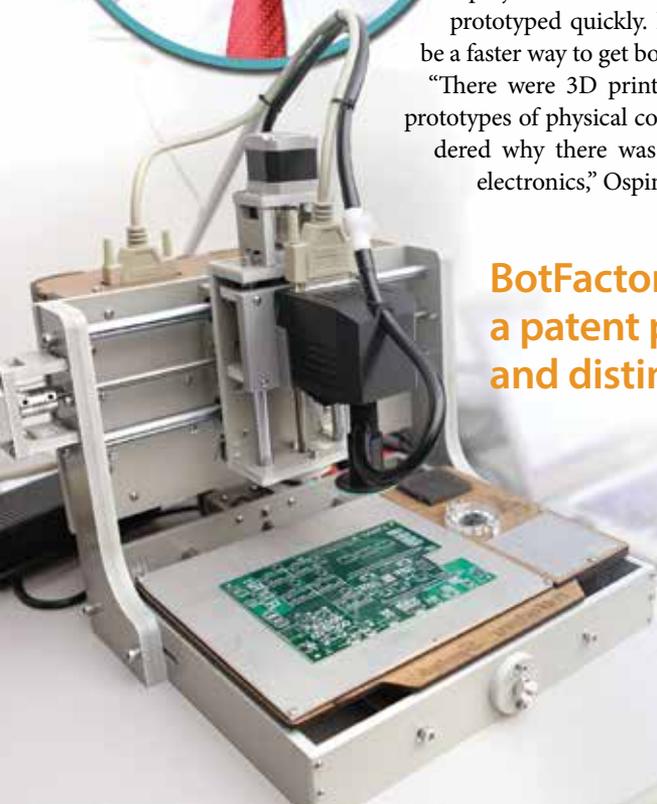
The Squink uses a three-step process to build and populate boards. It starts by printing the circuit traces with conductive ink, then extrudes drops of conductive glue where the components are mounted. Finally, the vacuum head picks up the electronic components and, using its vision and alignment system, accurately places them onto the conductive glue pads. For multi-layer boards, it prints non-conductive bridges over trace intersections to keep circuits isolated.

The machine can print traces as small as .010 inches on a variety of substrates, including flexible polyimide. The base model (\$3,999) includes software print heads and a starter pack of ink, paste and substrates. A \$4,999 version prints multi-layer circuit boards. All printers and supplies can be found at [botfactory.co](http://botfactory.co).

## Early obstacles

Ospina's innovation encountered several challenges along the way, beginning when he and a couple of his NYU classmates brainstormed on a way to get circuits prototyped quickly.

**BotFactory cofounder Carlos Ospina feels that having a patent portfolio has helped build trust with investors and distinguish his innovation from the crowd.**



Ironically, the first prototype of the system used the motion platform from an Ultimaker 3D printer. It also featured stock ink jet printheads to hold the ink. Moving a printhead in the desired path was no problem, but there were challenges to get the materials right for the ink and the conductive glue.

Conductive inks were available, but none of the common formulations would flow through a printhead. There were also problems with conductive adhesives; they were not conductive enough, and the epoxies used as the substrate were too brittle once cured. Ospina and the team worked with manufacturers and came up with custom formulations of conductive ink that would flow properly and glue that was ductile enough to do the job.

They also faced technical challenges with the pick-and-place system. Placing components accurately on the board requires half-millimeter precision.

“Placing a component even 1mm off center can cause a missed connection,” Ospina said. “We needed a more precise drive system to prevent misplaced components. The system had to be reliable.”

The belt-driven axes on the 3D printer were too sloppy and causing issues, so the team redesigned the motion platform for a more precise ball screw drive system.

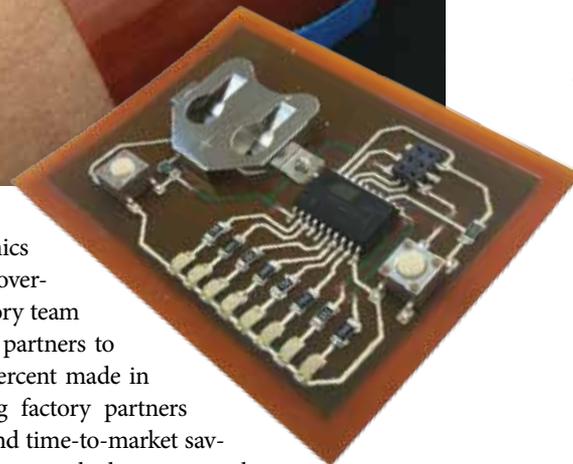
The pick-and-place system also needed a lot of software development. Custom algorithms were developed to handle the identification and orientation of the chosen component. This allowed the drive system to adjust for any misalignment of the component on the vacuum head and make placement more accurate.

## Big boost from IP

Ospina and the team filed a number of provisional patents around the technology. The first one is due to be published by the end of the year. Others are still in process, primarily covering the process of how the Squink builds the circuits.

Ospina feels that having a patent portfolio has helped build trust with investors and distinguish his innovation from the crowd. Other circuit printing technologies have been tried, but many have been purely academic pursuits. The intellectual property has helped BotFactory build a solid technology advantage over its competitors.

After working on the product for about a year, the team was running thin on funds and launched the product on Kickstarter in 2014. Despite the relatively high price for a crowdfunding product, the campaign managed to raise just over \$100,000. This proved the need in the marketplace for the technology and gave the team a financial runway to complete the design.



Although many electronics products employ low-cost overseas factories, the BotFactory team was able to find domestic partners to help. The Squink is 100 percent made in the United States. Having factory partners nearby offers huge value and time-to-market savings, and the team can keep a much closer eye on the quality of the final product.

However, the product's creators very much have a global vision. Ospina relishes the prospect of bringing PCB fabrication to places where it previously wasn't possible—such as remote communities and less-developed countries—because it democratizes technology development. In addition, he noted there are tangible applications for in-place PCB fabrication involving fields such as mining, or on ships.

The Squink has been a hit in industry, desktop manufacturing and maker movements. Many fab labs and design teams have been using the device in product development, including other products that have been launched on crowdfunding. The Squink's increasing foothold in the marketplace caught the eye of angel investors, raising more than \$1 million in addition funding in 2016. Its debut trip to the Consumer Electronics Show this past January made a big splash among industry insiders.

The BotFactory team continues to expand the product line. It has added a number of new accessories to its store, such as a PCB rivet press and shear. However, the big news is that the team is working on a new version of the Squink that will print faster, be more automated and print thinner traces. The original Squink is being used to make prototype PCBs for the new version. ☑

Above: This completed circuit was printed on the Squink Multilayer PCB Printer. A finished circuit printed on a flexible plastic can be used as wearable tech (top).

# TOOLS, MATERIALS AND PROCESSES

A prototype—a conceptual model of an idea for a new product—can be made from virtually any material via numerous tools, materials and processes. In product development, prototyping often entails the latest technological means to produce a result that closely approximates the intended end product.

You don't need all of the latest gadgets in order to build a solid prototyping workspace; all it takes is wisely choosing the right tools for you. Here are some simple and not-so-simple tools, materials and processes (some of these overlap, such as 3D printers and their process):

## TOOLS

### Table saw

It takes up a lot of space, but the handyman's best friend is a prototyping fixture due to its ability to cut through thick material such as wood. (Many inventors use plywood because it's so inexpensive.)

With a simple switch of the blade, a table saw can also be used on metals for creating tube frames or other metal-based prototypes. It will easily zoom through PVC pipe, another commonly used material for proof-of-concept prototypes.

If you want to max out the prototyping potential of your table saw, see if you can outfit it with a kit that turns it into a table router.

### Laser cutter

Another versatile cutting tool, a laser cutter is good for materials that include paper products, some plastics, wood, rubber and fabric. When designing prototypes for laser cutting, you can draw the shape

in CAD software and create tongue-and-groove features; cut pieces out of the desired material; then puzzle them together and lock them into place with super glue or solvent.

With a laser cutter, you can also design pieces that can be lined up and stacked together to make a prototype with more substantial thickness. This technique is commonly used when designing parts with gear trains. Typically, all of the pieces in the stack are given a common set of holes that are cut out in precise locations with the laser, and long screws or bolts are used to clamp them together. Once clamped together, they can then be sanded or filed down to make curved shapes for grips or other features.



### Rotary tool

Another essential prototyping element, the rotary tool with its varied bits and attachments can be used to grind, drill, sand, cut, saw, and polish. Many rotary tools even have accessories that can turn them into a table saw, router or drill press.

Make sure you get one with variable speed and an assortment of bits so you can work on different types of materials. The cherry on top: You can get a solid rotary tool in the \$100 range.

### Water jet cutter

This is used for heavy-duty cutting of flat parts in metals or thick plastics. It can also cut wood, composites and foam. A laser jet can only cut through one-fourth-inch thick plastic; the water jet can cut through up to 12-inch-thick steel. This is great for making prototypes that need metals either for strength or the ability to withstand heat.

The same tongue-and-groove design techniques used with a laser cutter can be used to make metal parts, and can be brazed or welded together to make strong parts with 3D geometry without having to machine them out of solid billet. The water jet can also be used to cut wood into precise shapes without having to use a saw.



## Metal shear/brake

If you've got to have a metal prototype, you've probably got to have one of these in order to accommodate the material's more rigid properties. A shear/brake can quickly cut and bend metals, and switching between the two is just a matter of where you place the piece of metal.

All you need to do is pull the lever to affect the part. Though the thickness of the material you can use depends on the size of the break, it is usually possible to bend short sections of up to 1/8" thick steel or aluminum for most desktop-sized units.

It's recommended to install this equipment on a heavy-duty shop table, due to the heavy loads. An office desk may not hold up.

## Hot glue gun

This is an underrated all-purpose fastener that is fast (once the gun is warmed up) and can be used on nearly every kind of material, including metal. A hot glue gun is also great for prototypes that have electronics or wiring; little dabs of glue can hold wires in place as a stress reliever, or small prototype circuit boards can be completely potted in hot glue to keep stray pieces of metal from shorting them out. Plus, if you glue two parts together and decide to rearrange them, the parts can usually be used again once the glue has been scraped off.

The guns come in many different sizes and power levels. Although regular craft glue guns are fine for most applications, commercial-grade hot melt guns heat up fast and flow better than consumer models.



## Mini CNC router

Available from many different manufacturers, a mini CNC router allows you to cut perfect shapes. Many of them use small rotary tools, such as Dremels, as the

cutting heads, which gives you even more value for that investment. These are in the \$1,000 range to get a system up and running.

## 3D printing

Also known as additive manufacturing, 3D printing is an essential tool for professional prototypers—and the technology is becoming less expensive for consumer-level models, with some quality products in the \$500 range. (They are even less in a kit version but require a few hours of assembly, and they require some software tuning to get good, consistent prints.) 3D printers can generate parts with complex surfaces in just a few hours.

The SLA 3D printer is one of the top-of-the-line prototyping devices. SLA is a resin-based type of 3D printing that uses ultraviolet light to cure the resin into the desired shape. It makes parts by tracing the geometry of each layer with concentrated UV light produced by a laser. The build platform is lowered into the resin bath after each layer to make fresh resin available for the next.

Depending on the geometry of the part, a wiper blade skims the resin every couple of layers to keep it building smoothly. The software calculates where the overhangs are and it prints a spider web like matrix of support structure to keep the part stable. Once the build is finished, the parts are scraped off of the build platform, and the supports are torn off by hand. Then the parts are scrubbed and rinsed in an alcohol bath to remove the excess resin. The finished parts are dried off and set into a UV light box for about half an hour to cure to their final toughness.



# MATERIALS

## Hard insulation foam

A great way to make prototypes quickly and cheaply is to use hard insulation foam, typically pink or blue and found at most home improvement stores. It is inexpensive, comes in large sheets, is easy to cut and can be glued into nearly any shape. It can be penetrated easily, and toothpicks can be used to pin pieces in place before gluing.

Hard insulation foam can also be cut into different profiles that can be glued together to create complex surfaces. It can even be used as a substrate for fiberglass molds.

## Paper-formed products

You don't have to break the bank or use exotic materials to make a good prototype. Paper and paper-formed products such as card stock and cardboard are commonly used, even if they rarely have the material properties of a finished prototype.

Card stock is useful because it is relatively sturdy and thin, making it easy to work with. Cardboard cut from shipping boxes has good strength.

You can use CAD software to lay out flat-pattern shapes that can be printed on card stock and folded into 3D shapes.



## Foam core

Another flat prototyping material that is similar to paper products and available in retail stores, foam core comes in many different thicknesses and can be carved into 3D shapes. If you need to come up with form models or ergonomic studies for products but 3D printing is too expensive for you, foam core is a great alternative.

## PVC pipe

Besides its use for prototype innovations that involve some kind of liquid handling, PVC pipe can also be used structurally. PVC tubing and fittings can be glued together to form simple frames or can be used as linkages or other mechanical components.

PVC tubing comes in such a wide range of sizes that it is suitable for many prototyping applications. The cylindrical shape can also be used as a form to bend thin pieces of sheet metal or tin foil to create perfectly curved shapes.

## Plastics

Among the most functional plastics for prototyping:

**Polyethylene terephthalate (PET)**, of which many beverage bottles are made, is rampantly available. Soda bottles are tough and are great for prototypes, especially if there is fluid handling component to the innovation. High-density Polyethylene (HDPE), another plastic commonly used for bottling, is useful as a prototype material for handling corrosive fluids. It can also be used as a sliding surface between parts, and tubes of it can be easily cut to make bearings.



**Vinyl and PVC** are a very versatile family of plastics. Vinyl can be made rigid or flexible depending on the formulation, which makes its applications wide ranging. The inexpensive and widely available PVC is one of the best prototyping materials. PVC pipe and fittings can be used as a modular building system, and it is easily locked into place with PVC cement. PVC cutters make it easy and clean to cut—though PVC should never be burned or laser cut. It will release toxic chlorine gas.

**Styrene** is a great prototyping material. Sheets of it are inexpensive, and up to about .060 thick can be cut with regular scissors. It can be bonded easily with super glue or model cement, and it holds paint well. Thin sheets of polycarbonate (PC) can be cut with scissors and bonded together with super glue. PC bottles can be cut with a Dremel tool or saw and can even be threaded to accept pipe fittings.

## Broken product parts

Many consumer products are filled with great mechanical components such as gears, axles, springs and buttons. Keep broken parts from items such as a vacuum cleaner or blender to use as spare parts for future products. Toys are another great source of mechanical components; it can be much cheaper to harvest a motor or gear train from a toy than to buy one.

For prototypes using circuits, you can scavenge from VCRs, old gaming systems and electronic toys to harvest low-level components such as resistors and capacitors, or even higher-end components such as speakers, motors and accelerometers.

## PROCESSES

### Vacuum forming

Blister packaging is one of the most common uses of vacuum forming. A piece of stock material is heated and stretched over a mold shape to make a part. In contrast, most consumer goods are made by injection molding, in which liquid material is forced into a mold cavity and left to freeze into shape.

In a vacuum former, a piece of stock plastic is locked down above the mold form and a vacuum chamber. A heater is brought in close proximity above the piece of plastic and allowed to warm the plastic to a prescribed temperature. When the material is at temperature, the mold form is lifted up and brought in contact with the hot plastic. At the same time, a vacuum pump is activated in the mold



chamber and causes the hot plastic to stretch and wrap around the mold form to make the desired shape. Once the plastic cools, the part is removed from mold and it stays frozen in place.

### Machining

This is one of the most popular ways to turn a block of raw metal into a finished part for a prototype. Machining is any process that uses a tool or bit to progressively remove small amounts of material to “whittle” the material to a finished dimension. The two most popular methods are milling and turning.

Milling, done on a milling machine, uses a rotating cutting tool to cut a block of material that is fixed to

a moving bed. Turning is done on a lathe and has the opposite setup where the raw material is the spinning part, and the tool is slowly moved against it to remove the material.

## Welding

Welding allows separate pieces of metal to be rigidly attached to each other. There are many different styles of welding and welding machines, but the most common are electric arc welders. They work by using electricity to melt the area around the two adjoining pieces while a filler rod of metal is fed into area to join them. Once the pieces are cooled, they are very strongly bonded together.



One of the biggest caveats to welding is that the materials being welded together need to be of similar metals and similar thickness. The process dumps a lot of heat into the parts, and when they cool they can warp. Parts for prototypes that need accurate features need to be machined after welding to get the required accuracy.

## Photo etching

A way to create highly detailed, yet thin metal parts, photo etching is a similar process to making photographic prints in a darkroom. A photosensitive laminate is placed over a thin sheet of metal. Then a mask is placed over the laminate and the sheet is exposed to UV light. The sheet is then put in a developer bath and the exposed areas are dissolved, leaving laminate to protect the metal in certain areas. Then it is placed in an acid bath and the unprotected areas of metal are dissolved away leaving the finished part behind.

Photo etching is only possible when working with metals up to .080" thick, but it can be done on just about any type of metal. It does not require special tooling, so iterations of prototype designs can be made cheaply. One of the most common uses for photo etching is to make copper traces for circuit boards and other small parts for electronics.

## STAY SAFE

Always wear protective eyewear and keep a first aid kit nearby. Also keep a small eyewash bottle around, as well as a small fire extinguisher. Work slowly and keep all safety devices on your equipment in place and functioning. No licensing deal is worth losing a body part or destroying your garage or house. ☹



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# ‘Improvement Inventions’ Need a Close Look

KNOW YOUR OPTIONS WHEN YOUR POTENTIAL PATENT RIGHTS OVERLAP SOMEONE ELSE’S **BY JOHN G. RAU**

**L**et’s say you have come up with a great idea that is a significant improvement to an existing patented product. You want to pursue getting a patent on this improvement, then either manufacture and sell this new product yourself or license it to other entities in hopes of making millions of dollars.

Sounds easy and reasonable, right? But wait a minute. You may be trying to sell a product that someone else may partially own.

Many inventors wonder whether another person’s patent prevents them from manufacturing the improved product or from obtaining a patent based on one or more improvements. The answer depends on separate questions and issues addressing patentability and infringement.

## The cross-licensing solution

Patents are issued not only for new inventions but for new and useful improvements to existing inventions.

In fact, most patents granted today are for improvements to existing inventions—generally referred to as “improvement inventions or patents” in which the patent’s claim scope is limited to an improvement to an existing product.

As with wholly new inventions, once you receive your patent you would only be able to prevent others from making, using or selling that improvement. If there is already an enforceable patent covering the existing product, that existing patent will likely dominate your improvement patent in the sense that the existing patentee can prevent you from making, using or selling that improvement in conjunction with the existing product because it would infringe on the earlier patent for the existing product.

This is a case of overlapping patent rights. You would be able to prevent the existing patentee from using your improvement without your permission; similarly, the existing patentee would be able to prevent you from

using your improvement to his or her product without obtaining permission. This could be a major marketability issue regarding your vision for commercializing your new invention.

Assuming the original patent is still valid—that is, has reasonable remaining life and the maintenance fees have been paid—the obvious solution is to work out some type of agreement with the owner of the original patent before attempting to move forward. This type of agreement is generally referred to as “cross-licensing,” wherein the holders of the original and improvement patents cross-license so each may manufacture and sell both the original and improved inventions.

If the originally invented product is still being sold in the marketplace, there could already be an established market for products such as yours. It could be an addition to an existing product line, resulting in a “win-win” for both parties.

But if the original product patentee is unwilling to give you permission to use his or her product, you’re stuck. You can’t sell your new product in the marketplace. One potential recourse would be to get the original patentee to buy your patent outright from you.

## Most patents granted today are for improvements to existing inventions.

### Check on the original patent

If the original patent is no longer valid, assuming your improvement passes the patentability test, a patent will be granted for the improvement. In that scenario, you won’t need a license from the original patentee and you’re free to move forward with your new product.

However, first ensure that you have conducted sufficient market research to assess whether or not enough people would be interested in your improvement and are willing to pay for it. Of course, if the improvement could be used with other unpatented products, that would open up more possibilities and markets.

You have the same set of issues to deal with in connection with an invention that is a combination of existing patented inventions. In this situation, the issues are more complex because you now have multiple “owners” besides yourself.

In summary, inventors must always be aware of the possibility that their new product idea is an improvement to existing products and their patents. In these cases, you are not necessarily free to make and sell the new, improved product. You will need some kind of agreement with these established entities before you can market and sell your new product. 📞

**John G. Rau**, president/CEO of Ultra-Research Inc., has more than 25 years experience conducting market research for ideas, inventions and other forms of intellectual property. He can be reached at (714) 281-0150 or [ultraresch@cs.com](mailto:ultraresch@cs.com).




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# IP Czar Among Confirmations

AMIN IS EXPERIENCED BUT NOT A FAVORITE OF INDEPENDENT INVENTORS **BY GENE QUINN**

**A**mong the 65 nominees by President Donald Trump that were confirmed by the Senate on August 3, Vishal Amin was the most significant for the intellectual property community. His confirmation as IP enforcement coordinator at the White House (commonly called the IP czar) was good news for some interest groups but not so good for others.

As senior counsel of the House Judiciary Committee, Amin was a primary architect of the Patent Trial and Appeal Board. The PTAB, created by the America Invents Act of 2011, has been a controversial addition with many strong critics. Amin had been a lawyer for U.S. Rep. Lamar Smith (R-Texas) working on the AIA, and then for U.S. Rep. and current House Judiciary Committee Chair Bob Goodlatte (R-Va.) working on the Innovation Act.



**Vishal Amin has been in the middle of IP legislation since President Obama took office in January 2009.**

Amin has been in the middle of IP legislation since President Obama took office in January 2009. Before that, he worked in the Bush White House and Commerce Department on patent reform and IP issues.

### Favored by film, music groups

Amin generally favors the PTAB and going after patent trolls. He has been strongly endorsed by the film, music and traditional copyright interests, which puts him at odds with the tech community on copyright, internet freedom and perhaps even cybersecurity issues (think proposals from Hollywood to enable proactive hacking to stop circumvention of copyright protection measures).

Because of his support for the PTAB and close association with the AIA and Innovation Act, the independent inventor community opposed Amin for this position.

According to Paul Morinville, managing director of US Inventor, Inc., the PTAB invalidates at least one claim in more than 95 percent of patents it reviews. Claims are selected for review by the petitioner, who is almost always the accused infringer or some company acting in their place to hide the identity of the

true petitioner. Invalidating just one claim can destroy the case for infringement and thus the patent.

The cost of defending a single PTAB starts at \$500,000 and burns many years of the patent's life.

### Davidson, Platt OK'd

Among other confirmations of note to the IP community was Peter Davidson as general counsel at the Commerce Department.

Davidson, a former lobbyist for Verizon, USWest and Qwest, was also general counsel for the U.S. trade representative and head of policy for then-House majority leader Dick Armey (R-Texas). Davidson also clerked on the U.S. Court of Appeals for the 10th Circuit. Given the role Commerce Secretary Wilbur Ross now plays on trade issues and given the recent news of Trump going after China on trade violations including patents, Davidson's trade representative background should keep him involved in this front-line issue.

Another key nominee confirmed is Michael Platt, assistant secretary of commerce for Legislative & Intergovernmental Affairs. Platt comes to the job with a rich experience in government and industry, working with all sides of the IP debate. He was chief of staff for U.S. Rep. Marsha Blackburn (R-Tenn.), who tirelessly advocates for artists and creatives from Nashville and nationally. The assistant secretary for intergovernmental affairs has played a key role in patent reform in years past.

### New common ground?

Despite the nonpartisan conclusion to the slew of nominees, an interesting partisanship between Hollywood and Silicon Valley is emerging. With the tech industry ramping up its lobbying spending during the first six months of the Trump Administration and with reports indicating that patents remain a top priority, the next six months may reveal areas of common ground and further division for industries and companies.

During this time, there will be activity on trade with China involving IP. Congress will turn to tax reform and will need to find new areas for cuts and revenue increases now that Affordable Care Act reform has not yet happened. Patent reform legislation could move, given the attention to PTAB abuse by the U.S. Supreme Court. 🐾

# Stats About PTAB Are Misleading

DOES THE PERCENTAGE OF PATENTS WITH DEFECTIVE CLAIMS EXCEED 90 PERCENT? **BY STEVE BRACHMANN AND GENE QUINN**

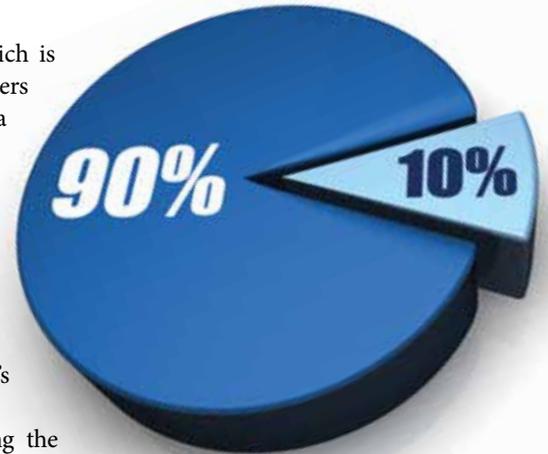
**S**tatistics published by the U.S. Patent and Trademark Office about the activities of the Patent Trial and Appeal Board paint a misleading picture, which is used to justify the agency's budget requests but does a poor job of adequately portraying the effects of post-grant review proceedings on intellectual property owners.

For example, PTAB statistics published last April by the USPTO indicated that while petitioners seeking inter partes review proceedings at the PTAB challenged slightly more than 99,000 claims, only 10,175 claims were found unpatentable by PTAB judges in a final written decision. (Inter partes review or IPR is a trial proceeding conducted at the PTAB to review the patentability of one or more claims in a patent—only on a ground that could be raised under U.S. Code Sections 102 or 103, and only on the basis of prior art consisting of patents or printed publications.) However, gang-tackling of patents distorts the reality behind those statistics from the perspective of the patent owner who must face multiple challenges to each patent brought by multiple challengers.

Using USPTO statistics, it can look like only slightly more than 10 percent of challenged claims are

invalidated by PTAB, which is not true. Multiple petitioners often gang up to challenge a single claim—which is why a patent-owning entity such as Zond can wind up losing every one of the 371 patent claims it owned while the PTAB can claim that the institution rate for IPR challenges on Zond's patents was 88.6 percent.

Perhaps instead of using the perspective employed by the USPTO on the percentage of claims invalidated at the PTAB, we should be talking about how many patents contain errors upon review by the PTAB. The patent office prefers not to use this metric because then it looks like the percentage of patents that have defective claims exceeds 90 percent—which means the office has a problem with an overactive PTAB, grossly inadequate patent examination, or both.



*(Continued on page 40)*

## Patents Worth \$1 Billion-Plus in District Court Lost at PTAB

**S**ome people vigorously defend the workings of the Patent Trial and Appeal Board as an administrative body, citing statistics on denial of institution or trial settlements in order to deflect any viewpoint that the PTAB is mowing down patents at an unusually high rate. There is also a pervasive viewpoint that the patents being challenged are weak patents that deserve to be declared invalid.

Nevada-based tech licensing company VirnetX Holding Corp. is a good case in point when trying to ascertain whether the PTAB is doing a virtuous job of cleaning up the U.S. patent system and invalidating weak patents.

VirnetX has brought eight patent infringement proceedings to U.S. district court, specifically the Eastern District of

Texas. Three suits have been filed against Microsoft Corp., four against Apple Inc. and one against Canadian telecom firm Mitel Networks Corp. The cases have been filed between February 2007 and August 2013; three of the actions filed against Apple remain open.

Data pulled from IP litigation research company Lex Machina show that VirnetX has been fairly successful in asserting its intellectual property in district court. Case resolutions show that VirnetX has achieved a claimant win in one case and four other cases have terminated with likely settlements; one of those settlements was a plaintiff voluntary dismissal in one of the Apple cases, which was filed after the patent at issue was added to one of the other district court proceedings against Apple.

These cases ended up being very valuable to VirnetX, at least initially.

VirnetX has been awarded nearly \$1.1 billion in total damages from the cases thus far. The jury verdict form in one of the Microsoft cases shows that VirnetX proved willful infringement of two of its patents, earning reasonable royalties in an amount reaching \$105.75 million. A jury verdict entered in one of the Apple cases shows that VirnetX also proved willful infringement of the asserted patents in that case, entering a reasonable royalty award of \$625.33 million for infringement posed by Apple's FaceTime and iMessage services as well as virtual private network (VPN) features. Analysis shows that all of the VirnetX patents asserted in

*(Continued on page 40)*



**Using USPTO statistics, it can look like only slightly more than 10 percent of challenged claims are invalidated by PTAB, which is not true. Multiple petitioners often gang up to challenge a single claim.**

**Stats About PTAB Are Misleading** (cont. from page 39)

**A different data analysis**

Using the legal data analytic tools available through IP litigation research company Lex Machina, we're able to see a different perspective on PTAB data based on the outcomes of trial resolutions. Overall, across nearly 7,000 PTAB petitions (the overwhelming majority of which are IPRs), only half reach the institution stage.

Given PTAB rules on consolidating multiple cases challenging claims from a single patent, it could be safely assumed that there's a 1:1 ratio of trials to patents after institution of a trial at the PTAB. Also, it needs to be pointed out that if 50 percent of PTAB petitions are instituted, only 17 percent are denied. Many petitioners continue to challenge the same patent despite such denials of institution (as in the case of Zond), so it's likely that many of those claims eventually have a petition instituted. Fourteen percent of petitions are still open pre-institution and 13 percent reached settlements in which a patent owner almost certainly gave up claims or otherwise agreed to end the case on unfavorable terms. Only 4 percent of all PTAB petitions for

review proceedings end with a final written decision in which all claims are upheld as patentable.

That's right: Only 4 percent of all PTAB petitions end with a final written decision in which all claims are upheld as patentable!

A few other data-based perspectives exist with a narrower focus on petitions that have led to final written decisions issued from PTAB administrative patent judges. Of the 1,556 petitions for patent review proceedings at the PTAB that have reached final written decisions, only 16 percent of those final written decisions left all claims upheld. Of the remaining 84 percent of cases, a full 69 percent (1,076 petitions) have led to findings of all claims unpatentable, with 15 percent of final written decisions a mixture of claim findings in which at least some claims have been invalidated. Given that different petitions can challenge different claims from the same patent, these statistics suggest that less than 16 percent of challenged patents reaching final written decisions may be walking away unscathed.

**Patents Worth \$1 Billion-Plus in District Court Lost at PTAB** (cont. from page 39)

district court survived every single challenge of invalidity; not a single patent claim was declared invalid under Section 101, Section 102 or Section 103 statutes, and findings of no invalidity are also reflected in the Microsoft jury verdicts.

The patents asserted by VirnetX were considered to be both valid and of great value, at least in a federal district court.

**Patents targeted by PTAB?**

Not only have VirnetX's patents earned it large awards of reasonable royalties at the district court level, the company has also survived patent validity challenges at the U.S. Court of Appeals for the Federal Circuit. Although the federal circuit vacated and remanded a district court damages award for

VirnetX in September 2014 in *VirnetX, Inc. v. Cisco Systems, Inc.*, an action arising from one of the Apple cases, it "affirm[ed] the jury's findings that none of the asserted claims are invalid and that many of the asserted claims of the '135 and '151 patents are infringed by Apple's VPN On Demand product."

So obviously, the patent claims VirnetX has used to pursue infringers such as Apple and Microsoft are not the weak patents that opponents of the patent system claim are the scourge of the system. Well—not so fast! Just because an Article III federal district court confirms the validity of a patent doesn't mean anything anymore. Federal courts have become subordinate to the PTAB, which is as ridiculous as it sounds but true. A patent is not valid until

an Article I executive tribunal says so, and absolutely no deference is paid to Article III judges of the United States federal courts.

From June 2013 through November 2016, VirnetX faced a barrage of 68 inter partes review challenges at the PTAB. Apple is listed as a petitioner on 42 of those IPR petitions. Other parties filing petitions include Microsoft, RPX Corp., Black Swamp IP, LLC, and The Mangrove Partners Master Fund, Ltd. Only one of those petitions resulted in a final written decision finding all claims patentable. Eighteen final written decisions found that all claims were unpatentable.

It appears that the patents that have been adjudicated to be worth hundreds of millions of dollars in district court were the



The numbers are even more significantly tilted when adding in both pre- and post-institution settlements; again, many (if not all) of these settlements result in outcomes unfavorable to the patent owner. When looking at these numbers, only 8 percent of petitions reach a final written decision of all claims upheld. There's no data on PTAB settlements that allow us to definitively say this, but it could be the case that more than 90 percent of patents challenged at the PTAB meet some sort of tragic fate involving the invalidation or amendment of at least some of its claims.

## The judges' role

Lex Machina data scientist Brian Howard did note that there are a few reasons the numbers for PTAB trials might naturally reach these conclusions. First, the role of the institution decision is such that administrative patent judges have decided a petitioner has already proven his or her invalidity challenge has merit.

"If judges are doing a really good job on institution, one should expect to see that most of the decisions instituted reach a fairly favorable petitioner outcome," Howard said. "Institution decisions seem to be the gatekeepers." Howard also noted that from a petitioner's standpoint, the filing of serial petitions may be less a function of ganging up on a patent owner and more a strategic breaking up of material in a way that some entities do when filing for reexaminations at the USPTO. He cited information from a soon-to-be-released Lex Machina report on PTAB statistics indicating that the top 55 or so patent owners targeted by PTAB challenges accounts for 20 percent of the total number of petitions filed, and Zond received the most

challenges but only accounts for 1 percent to 2 percent of the total.

And yet, there are reasons to think that the statistics we've pulled from Lex Machina suggests major issues with PTAB activity. At least 84 percent of patents reaching a final written decision in a PTAB validity challenge are adjudicated to have at least one invalid claim (usually many more than one claim), with 69 percent having all claims invalid. Add settlements, which are virtually certain to be unfavorable to patent owners (especially post-institution, when the petitioner has much more leverage), and at least 92 percent of patents challenged are defective.

Given that these are also patents that have been pre-vented by owners for licensing and enforcement purposes, this suggests that either PTAB APJs are being too aggressive in invalidating patents or that the examiners are producing incredibly poor quality patents through extremely poor quality patent prosecution. 🐾

**Gene Quinn** is a patent attorney, founder of IPWatchdog.com and a principal lecturer in the top patent bar review course in the nation. Strategic patent consulting, patent application drafting and patent prosecution are his specialties. Quinn also works with independent inventors and start-up businesses in the technology field.



**Steve Brachmann** is a freelance writer located in Buffalo, N.Y., and is a consistent contributor to the intellectual property law blog IPWatchdog. He has also covered local government in the Western New York region for The Buffalo News and The Hamburg Sun.



ones targeted most heavily at the PTAB. U.S. Patent No. 7,490,151, the validity of which was specifically affirmed by the federal circuit, was targeted by eight IPR petitions at the PTAB. Two petitions resulted in settlements, one of which was post-institution; three others were procedurally dismissed prior to institution; and one other petition was instituted, leading to a final written decision of all claims unpatentable.

Amazingly, these PTAB decisions seem to have completely changed the federal circuit's stance on the patent eligibility of the subject matter in the VirnetX patents. In one decision handed down by the circuit last December, the court upheld findings of invalidity at PTAB on yet another VirnetX patent that had been asserted against Apple. The same day of that

decision, VirnetX released a press release noting that three federal circuit decisions upheld PTAB invalidity findings.

## 'Patent as piñata'

There has been a great deal of discussion in recent years on whether the PTAB is a death squad for commercially viable patents. At least in the case of VirnetX, this definitely appears to be the case. The "patent as piñata" metaphor also seems fitting here. It's as if Apple, Microsoft, RPX and others are children sitting at a birthday party, each of them getting a turn to take a crack at the VirnetX piñata (Apple getting the most cracks because, let's remember, this is Apple's party at the end of the day).

The PTAB has always been touted as an alternative venue to U.S. district courts,

which would lower the costs of fighting patent infringement cases. Increasingly, however, the PTAB does not lower the cost of patent infringement litigation but instead increases the cost in many situations, such as when these patents had been thoroughly litigated and even confirmed valid all the way up to the federal circuit.

The PTAB gives efficient infringers a great alternative, which can be used to extricate themselves from jury verdicts awarding hundreds of millions of dollars in reasonable royalties. Of course, the inverse is true for VirnetX, which had to deal with the costs of almost 70 PTAB proceedings sprung from eight district court cases and saw incredibly valuable and previously confirmed valid property rights ripped away. 🐾

—Steve Brachmann and Gene Quinn



## Xi Has Warning for Infringers

AS CHINA'S PRO-PATENT REPUTATION GROWS, U.S. LEADERS MUST TAKE NOTE

BY STEVE BRACHMANN AND GENE QUINN

**C**hinese President Xi Jinping made some unusual comments regarding intellectual property during the recent National Financial Work Conference, especially involving IP infringement.

“Wrongdoing should be punished more severely so that IP infringers will pay a heavy price,” President Xi said, according to the report by Intellectual Asset Management.

According to IAM, the comments are the most extensive the president has made in public on the subject of intellectual property protection. He called on national authorities to advance IP regulations, improve the quality and efficiency of examinations and to accelerate the building of IP institutions. The remarks are a major acknowledgement of the importance of strong IP protections to a nation’s economy directly from the head of state of one of the world’s strongest economies.

Political leaders in Washington, D.C., should take notice of President Xi’s comments.

litigation at Beijing East IP. “China knows that only by protecting patent rights will individuals and companies have incentive to create new technical solutions.”

In the most recent IP index released this year by the U.S. Chamber of Commerce, China increased its overall ranking on the strength of its IP system to 27th overall out of 45 nations. Two of the key areas of weakness listed holding back China’s score included historic and growing levels of IP infringement, as well as challenges in the ability of IP owners to secure adequate remedies for infringement.

China’s patent system ranked 20th in the most recent IP index from the U.S. chamber. If President Xi enacts policy that backs up his recent comments, it wouldn’t be surprising to see China’s ranking rise in next year’s index, perhaps rather significantly.

### U.S. going the other way

Meanwhile, as President Xi actively moves China’s IP policy to a place where infringers are met with harsher penalties, U.S. leadership in Congress—especially in the House of Representatives—seems to be opening its arms again to the efficient infringer lobby. U.S. Rep. Bob Goodlatte (R-Va.), chairman of the House Judiciary Committee, and U.S. Rep. Darrell Issa (R-Calif.), chairman of the House IP subcommittee, support legislation and poor narratives that continue attempts to further gut the U.S. patent system by allowing infringers a free holiday and the ability to infringe without consequence or penalty.

The legislative agenda released this year by Goodlatte included calls for additional patent litigation reform to address “truly frivolous lawsuits.” Issa, an inventor listed on 37 patents used in various patent enforcement regimes, takes an incredibly dim view of all patent owners. In recent days, the House IP subcommittee has piled on, looking for ways to further reduce venue for plaintiffs in infringement suits and turning into a forum for attacking judges on patent cases and the critics of patent reform. The witness panels put

**With the support of President Xi, China could very quickly move to become the preferred jurisdiction for innovators, given the market size afforded by a country with 1.4 billion people.**

### More momentum

In China, where there is single-party rule, change can happen dramatically—as we have seen start to take place on the patent and innovation landscape. With the support of President Xi, China could very quickly move to become the preferred jurisdiction for innovators, given the market size afforded by a country with 1.4 billion people. If acted upon in a serious way, this new Chinese approach to dealing with infringers could send a shock wave through the entire intellectual property community, if not the entire world economy.

“President Xi’s statement on the importance of IP enforcement indicates China’s growing status as a leader in innovation,” said Erick Robinson, a U.S. patent attorney based in Beijing. He is director of patent



together for the House IP hearings border on atrocious; recent hearings have included at least one witness who had no business being on the panel.

It is ironic to read President Xi's comments in juxtaposition with Congressman Issa's comments from an April 2016 hearing, when he said: "For purposes of my opening statement, 'plaintiff' and 'troll' will be interchangeable."

While factions within the U.S. seriously discuss further dismantling the U.S. patent system in favor of infringers, China continues to take the lead in increasing the enforceability of patents, eating the lunch that the United States of America is serving to that country on a silver platter.

As patentability for software and business methods has declined in America, China issued revised guidelines on patent policy last fall that increased patentability for both software and business method inventions. China has set up courts that are dedicated to hearing

## Meanwhile, U.S. leadership in Congress seems to be opening its arms again to the efficient infringer lobby.

IP cases, and foreign plaintiffs have been using those courts to protect their intellectual property; foreign plaintiffs won 100 percent of the infringement cases they brought to China through last November. The number of inventors filing patent applications in China is swelling, with that country totaling 1 million patent applications filed in 2015. That was one-third of all global patent applications filed that year.

China is obviously becoming a better jurisdiction for patent right enforcement and the protection of venture capital investment into burgeoning fields of technology. ☞

# USPTO Response to FOIA is Unsettling

NO RULES OF CONDUCT POSTED FOR PTAB JUDGES BY GENE QUINN

**S**everal months ago, I submitted a Freedom of Information Act request to the United States Patent and Trademark Office. My request sought a copy of all rules of judicial conduct, ethical policies and/or codes of professional or judicial conduct that apply to administrative patent judges of the Patent Trial and Appeal Board.

A few weeks later, I received a response from the USPTO informing me that the information I requested is indexed and publicly available at the USPTO website. But the website link provided contains no rules of judicial conduct or codes of judicial conduct, which means that the USPTO has indirectly confirmed there are no posted rules or codes of judicial conduct that apply to APJs at the PTAB. All that appears at the webpage provided are general ethics rules that apply to all employees of the USPTO. None of the documents specifically mention the board, the PTAB, judges, or APJs.

To call this revelation by the USPTO shocking is an understatement. Chapter 37 of the Code of Federal Regulations (37 CFR 11.803) clearly contemplates the existence of rules of judicial conduct applicable to APJs, which obviously do not exist. According to Section 11.803, a practitioner commits a breach of



the rules of ethics applicable to the practitioner if the practitioner becomes aware that an APJ has violated the "applicable rules of judicial conduct" and does not report such violation(s) to the appropriate authority. How can a practitioner inform the USPTO of a breach of applicable rules of judicial conduct violated by an APJ when no such rules exist?

The lack of any judicial rules of conduct or ethical rules specifically tailored for judges on the PTAB is highly informative, and explains why it was possible for at least two PTAB judges to decide post-grant challenges filed by former patent defense clients.

*(Continued on page 44)*



## USPTO Response to FOIA is Unsettling (cont. from page 43)

In my opinion, this PTAB scandal symbolizes everything that is wrong with a tribunal that is out of touch with reality. Before being hired in March 2013 by the U.S. Department of Commerce to become an APJ on the PTAB, Matthew R. Clements represented Apple as patent infringement defense counsel while working for Ropes & Gray. Since September 2014, APJ Clements has been assigned to numerous petitions, mostly covered business methods but some inter partes reviews filed by Apple, his former client. Clements's record in deciding cases, perhaps predictably, is tilted overwhelmingly in Apple's favor.

### The website link provided me by the USPTO contains no rules of judicial conduct or codes of judicial conduct.

Similarly, APJ Stacy Beth Margolies has served as an APJ on at least two IPRs petitioned by Apple, both of which challenge patents owned by Voip-Pal.com, a developer of internet telecommunications technologies. According to information from Public Access to Court Electronic Records, Margolies represented Apple as counsel in *Fast Memory Erase LLC v. Spansion Inc. et al.*

It is practically unbelievable that the USPTO allows a PTAB judge to decide petitions filed by former patent infringement defense clients after a 1-year recusal period.

### PTAB vs. practitioner ethics

The rule adopted by the USPTO to deal with ethical obligations to former clients is found in Chapter 37 of the Code of Federal Regulations, Section 11.109, which reads in part: "(a) A practitioner who has formerly represented a client in a matter shall not thereafter represent another person in the same or a substantially related matter in which that person's interests are materially adverse to the interests of the former client unless the former client gives informed consent, confirmed in writing."

The comments to American Bar Association Model Rule 1.9 are instructive, because in 2013 the USPTO adopted the ABA Model Rules to govern patent practitioners. The comments to Rule 1.9 read: "Matters are 'substantially related' for purposes of this Rule if they involve the same transaction or legal dispute or if there otherwise is a substantial risk that confidential factual information as would normally have been obtained in the prior representation would materially advance the client's position in the subsequent matter."

It also says: "knowledge of specific facts gained in a prior representation that are relevant to the matter in question ordinarily will preclude such a representation."

Clearly, in defending Apple for patent infringement the attorneys would learn all kinds of confidential and

sensitive information about Apple, its business and legal philosophies, how it treats patent owners, litigation strategies, whether it intended to settle, whether it would engage in a war of attrition, etc.

There is no time limit on a duty to a former client, at least if you are a patent practitioner. So the 1-year recusal period is wholly without precedent and inappropriate for PTAB judges.

### Rules on federal judges

Canon 2A of the Code of Conduct for Article III judges, under the title "Respect for Law," says: "A judge should respect and comply with the law and should act at all times in a manner that promotes confidence in the integrity and impartiality of the judiciary." The commentary that goes along with Canon 2A begins by tackling the issue of an appearance of impropriety.

Canon 3C, under the title "Disqualification," reads in part: "A judge shall disqualify himself or herself in a proceeding in which the judge's impartiality might reasonably be questioned..."

In the situation where there is not a per se disqualification under Canon 3C—such as for personal bias, the judge serving as a lawyer in the same controversy, or the judge or a family member having a financial interest—the judge may disclose the reason disqualification would seem appropriate under Canon 3C and leave it up to the parties to decide. In this situation, however, the rules are very specific.

The judge may participate in the proceeding if, after that disclosure, the parties and their lawyers have an opportunity to confer outside the presence of the judge, all agree in writing or on the record that the judge should not be disqualified, and the judge is then willing to participate. The agreement should be incorporated in the record of the proceeding.

Thus, the rules of conduct applicable to an Article III federal judge are dramatically more strict than the measly 1-year recusal period the USPTO places upon PTAB judges.

### Conclusion

PTAB judges are appointed by the Secretary of Commerce, which makes them far more than mere employees of the USPTO. They should be held to a higher standard than a generic all-employees-ethics policy.

President Trump campaigned on draining the swamp that is Washington, D.C. Many on the left and the right have tried to do so in the past, so many are understandably very skeptical. If President Trump is serious about preventing insiders from accessing influence, how can the Department of Commerce justify allowing hand-picked PTAB judges to hear and decide cases dealing with the interests of a former defense client? ☹

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Whether your concern is how to get started, what to do next, sources for services, or whom to trust, I will guide you. I have helped thousands of inventors with my written advice, including more than nineteen years as a columnist for *Inventors Digest* magazine. And now I will work directly with you by phone, e-mail, or regular mail. No big up-front fees. My signed confidentiality agreement is a standard part of our working relationship. For details, see my web page:

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## Patent Process Help

Worried about the daunting prospect of filing a patent? There's help via a new program from the United States Patent and Trademark Office.

The USPTO's Office of Innovation Development launched a **Patent Virtual Assistance Pilot Program** in partnership with select Patent and Trademark Resource Centers (PTRCs) throughout the United States. The pilot program offers one-on-one virtual assistance in a WebEx video conference with a USPTO representative, using a PTRC's privately located, secure computer. You can get answers to questions, present a draft of your patent application for a cursory review, or other options. (USPTO employees cannot give legal advice or make patentability determinations before an application is filed.)

The first partnership is with the PTRC at the Broward County Main Library in Fort Lauderdale, Florida. As the pilot program continues, the USPTO will seek to expand it to other PTRC locations throughout the country. More information: 866-767-3848 or innovationdevelopment@uspto.gov.

## Wunderkinds

We crank up the Wayback Machine this month to salute an iconic treat during these waning days of summer. In 1905, 11-year-old **Frank Epperson** left a cup of powdered soda, water and a stirring stick outside on a particularly cold Oakland, California, night. When he awoke, he had inadvertently discovered the Popsicle. Epperson, who initially called his invention the Epsicle, got a patent in 1924 before selling the rights to the Joe Lowe Company of New York in 1925. The rest of the story is frozen in time forever.



**3** Which of these patents granted during September came first—the flash bulb used in photography, or “synthetic fiber” (nylon)?

- A) Steve Allen
- B) Erma Bombeck
- C) Ralph Nader
- D) Ronald Reagan



## What IS that?

According to Baxbo LLC, people who say beer drinking hurts your physique need to get a grip. **MugMuscles** holds 27 oz. for your “workout” (although Amazon.com says it's 20 oz.). “The built-in (spring-loaded) grip exerciser makes working out exciting,” says Baxbo.com, also known for its FlaskTie and FlaskScarf. So get “sippin’ and rippin’,” the plastic mug says.

## 5.6 million

The number of worldwide shipments of **3D printers** expected by 2019, according to U.S. research and advisory firm Gartner. Shipments are projected to at least double every year to that point. China-based International Data Corp. predicts that by 2020, the 3D printer market in China—helped by falling prices—will show a compounded annual growth rate of 43 percent.

## WHAT DO YOU KNOW?

**1 True or false:** Henry Ford invented the automobile.

**2** Who said this, regarding automobile innovation? “Car designers are just going to have to come up with an automobile that outlasts the payments.”

**4** The first known copyright was granted in Venice, Italy, on September 1 of what year?

- A) 1496
- B) 1610
- C) 1703
- D) 1801

**5 True or false:** The book “Little Women” by Louisa May Alcott was registered 47 years after it was first published.

**ANSWERS:** 1) False. Nicolas-Joseph Cugnot invented the first steam-powered automobile capable of human transportation in 1768; some sources say the automobile was invented by Karl Benz in 1885 or 1886. 2) B. 3) Johannes Ostermeier's flash bulb patent was granted in 1930; the patent for nylon, issued to Wallace Carothers, was in 1938. 4) A. It gave an author exclusive control over a book and imposed a fine of 500 ducats to anyone who printed his or her work without permission. Plagiarism had become easier after the invention of the printing press in Europe in the 1400s. 5) True. First published on Oct. 3, 1868, it was registered on Sept. 18, 1915.

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Whether you just came up with a great idea or are trying to get your invention to market, **Inventors Digest** is for you. Each month we cover the topics that take the mystery out of the invention process. From ideation to prototyping, and patent claims to product licensing, you'll find articles that pertain to your situation. Plus, **Inventors Digest** features inventor pros and novices, covering their stories of success and disappointment. Fill out the subscription form below to join the inventor community.



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