

CRAIN'S CHICAGO BUSINESS

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Chicago's Most Innovative Companies 2021

We looked at area firms whose patent games were particularly strong to come up with 10 doing very cool things.

JOHN PLETZ



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Innovation comes in all forms: a tennis racket or football helmet, an office chair or desk, a garage door, a candy wrapper or software.

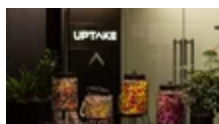
Those are all items patented last year by Chicago-area companies that are at the top of their game. The inventors range from startups, such as Narrative Science, NuCurrent and Uptake Technologies, to iconic names, such as Riddell, Wrigley, Wilson and Bankers Box.

They're among Chicago's Most Innovative Companies. Several have been on our previous lists over the past 10 years, demonstrating that for some, innovation isn't a goal; it's a way of doing business.

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Though the types of innovation in this year's list vary widely, there are common threads. The COVID-19 pandemic hasn't dampened the commitment to innovation, but it has changed how it gets done, in some ways for the better. The pace of invention is speeding up, as product cycles shorten and customer preferences change rapidly. Companies are driven to innovate in how they make and package their products. Sustainability is now a driving force in research and development.

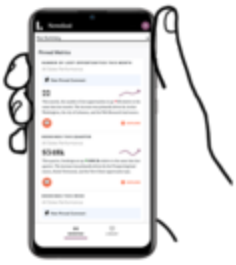
This list is compiled in partnership with Ocean Tomo, an intellectual property advisory, investment-banking and consulting firm, which evaluates the patents produced each year by Chicago-area companies and ranks them based on quality.

1. Narrative science

What it does: Artificial-intelligence software for business | **Patents last year:** 13

Stuart Frankel is on a mission to get rid of the dashboard.

Long a staple of the data analytics software used by companies to absorb information about everything from sales to supply chain, the dashboard is holding back business intelligence, says the CEO of Narrative Science.



"Our view is dashboards are antiquated," says Frankel, who co-founded the artificial-intelligence software company based in Chicago in 2010. "The dirty secret is very few people use dashboards. So we took a step back a few years ago and said: 'No matter what we do, as long as we're beholden to the dashboard, we knew we wouldn't be able to change the experience for business users.' "

The company's Lexio product, launched last year, looks more like a social media newsfeed than a traditional dashboard. It pulls information from analytics and data platforms already in use by a company—such as Salesforce, Tableau or Snowflake.

"We were inspired by Twitter, Apple News and Netflix," Frankel says. He believes businesses should have "the same consumption experience that we do at home."

It's harder than it sounds. Narrative Science software engineers developed a capability called "write like me" that learns how individual businesses communicate—the metrics they care about and how they describe them.

"Write like me" is one of the patents that propelled Narrative Science to the top spot on this year's Most Innovative Companies list. It also led [the list in 2018](#).

Narrative Science has been teaching machines to think and write like humans since it [spun out of Northwestern University](#). The company, which employs about 75 people, operates in a niche of artificial intelligence called natural-language generation. It has amassed a total of 45 patents.

It has been at the crossroads of two major trends: artificial intelligence and the democratization of data within businesses. International Data Corp. says spending on AI systems will more than double by 2025 to \$204 billion.

Narrative Science's expertise in speech is part of the broader evolution of AI and computing. "If you're in an office with other people, you use a keyboard," says Mark Hasegawa-Johnson, a professor at the University of Illinois at Urbana-Champaign. "If you're at home, doing dishes, you use speech. The goal is to move seamlessly back and forth."



2. Riddell

What it does: Sports equipment | **Patents last year:** 8

Riddell, which started making football helmets in the 1930s, thinks one way for them to better protect players' heads is to make them fit better.

The Des Plaines-based company, which is the top seller of football helmets, has been making custom-fitting helmets for professional and top college teams for a few years. Now it wants to customize helmets for the masses.

"We can make the technology available to youth groups, high schools and colleges without the resources of professional teams or major universities," says research and development manager Vittorio Bologna.

Two innovations are making it possible. Advances in 3D-printing technology and manufacturing processes allow Riddell to make build-to-fit foam inserts inside a helmet. Technology for scanning

a player's head evolved from large machines to portable devices to a mobile phone app.

"It wasn't straightforward," says Thad Ide, senior vice president of research and product development at Riddell. "You can make a custom version of anything. The trick is adapting it for mass production."

The company plans to roll out the new, build-to-fit technology and helmets next year.

Customization is just one of the innovations in the patents awarded to Riddell last year. Other advances involve improvements in making the external shell of helmets more flexible in key areas, as well as a flexible face guard and quick-release face mask system.

Riddell, which was founded in 1929, has a long history of innovation. It developed the first plastic football helmet and the web-suspension system that made its way into military helmets during World War II. It was in the Top 10 of Crain's [Most Innovative Companies lists in 2018](#) and [2014](#).

3. Hollister

What it does: Medical products | **Patents last year:** 15

For medical products maker Hollister, which has R&D teams and customers scattered around the globe, innovation traditionally meant a lot of in-person collaboration. But COVID-19 changed all that.



So the company adapted by using virtual-reality cameras and headsets to allow engineers in Chicago, Ireland and Denmark to work remotely with each other and customers, says Paola Wisner, vice president of research and development. "It accelerated our collaboration."

There were unexpected upsides to using cameras, says Seamus Fitzpatrick, Hollister's senior director of research and development. "We could see customers using our prototypes, and we were able to re-review things in a more precise way because we had it on tape. You also can access more diversity of thought with virtual tools because you can include more people."

The 100-year-old company based in Libertyville is a patent powerhouse that has been among the Top 10 of Crain's Most Innovative Companies list three years in a row.

Among its patents issued in 2020 was a flip-top container that makes it easier to access a catheter and return it after use.

"The simplest solution for a container is one that twists open and closed," Fitzpatrick says. "A lot of customers have difficulty with hand movement and making a twisting motion, so we thought about

how to make it easier. Maybe we can eliminate the twisting motion altogether."

While they were at it, engineers also made the container more eco-friendly, using a plastic that's more easily recycled. "Environmental sustainability isn't an excuse to have inferior products," Fitzpatrick says.



4. NuCurrent

What it does: Wireless power technology | **Patents last year:** 5

NuCurrent keeps finding ways to make wireless charging better.

The company, which topped our [Most Innovative Companies list in 2019](#), received patents last year for improvements that allow faster wireless transmission of power and data to devices, more than doubling the amount of power delivered and quadrupling the amount of data traveling to a device. It allows product designers to ditch copper and plug-in connectors, reducing the size and weight of devices.

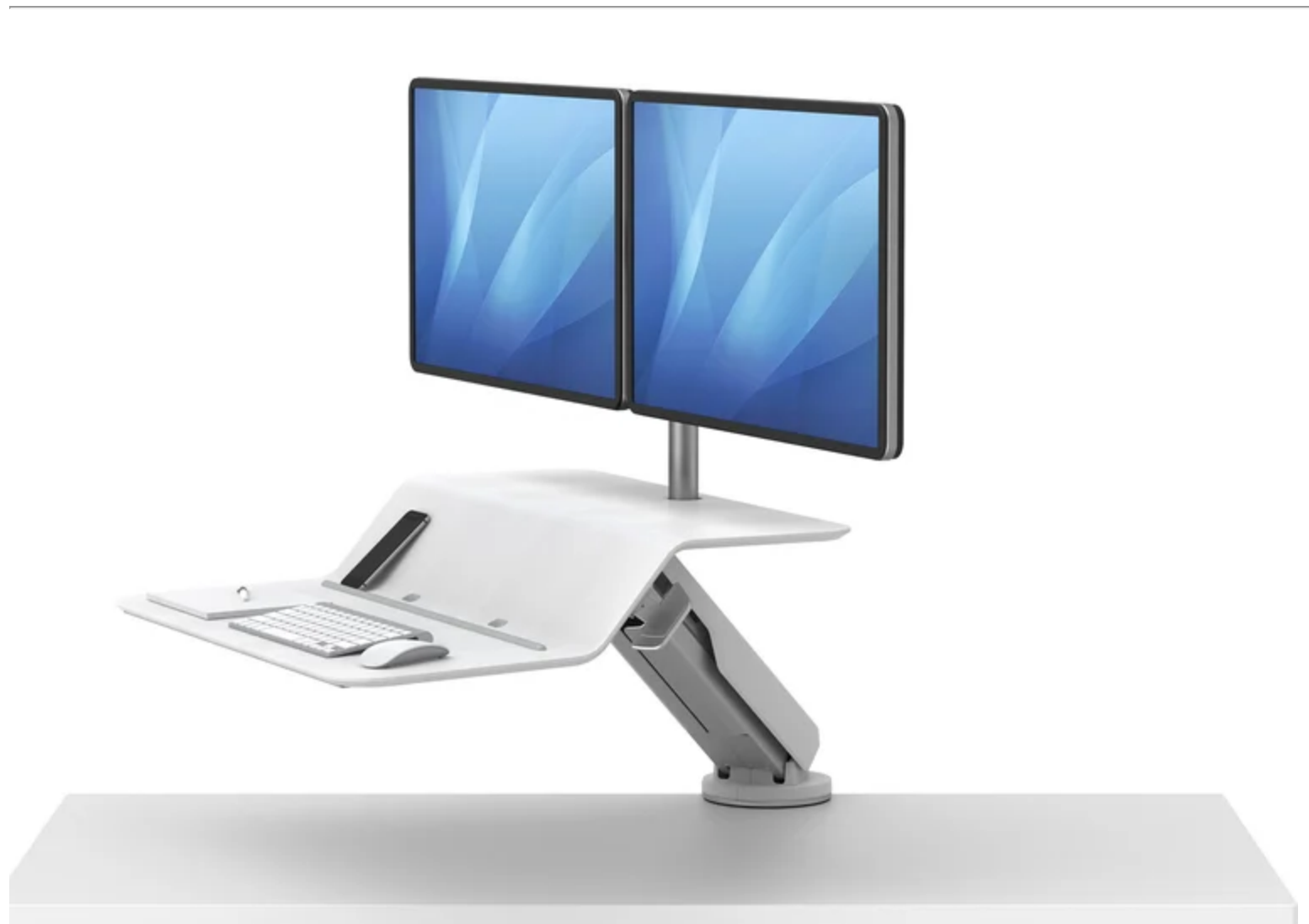
NuCurrent got its start at a Northwestern University business plan competition, just as the idea of wireless charging of phones and other devices was starting to catch on. Its technology made its way into products starting in 2015. Since then, the company has been making steady advances in capabilities and solving new problems.

One recent innovation detects interference between a charging unit and a device, which can lead to heat buildup. "It's a big concern for smartphones, industrial chargers or kitchen devices," says

founder and CEO Jacob Babcock.

The company also received patents last year for developing a way to transmit power through metal without generating excess heat. Previously, companies had to use materials such as plastic or wood if they wanted to allow wireless charging. "It allows companies to build products with a metal housing—devices such as headphones, wearables, automotive and health care devices," Babcock says.

With 52 U.S. patents, NuCurrent has come a long way since it was founded in 2009. It has 50 employees and big-name customers, such as Honeywell, Klipsch, Dish Network, Spalding and Whoop.



5. Fellowes

What it does: Office furniture | **Patents last year:** 5

Fellowes has evolved from making office work easier to making it easier to work in the office.

The company that introduced the cardboard Bankers Box over a century ago, and then moved on to paper shredders, lately has been reinventing office furniture with standing desks, chairs and other accessories.

It developed a unique office chair called the Elea, with a suspended seat. "We built a chair from the ground up," says John Fellowes, the fourth-generation CEO. "It's a combination of an exercise ball and a high-design chair. We looked at anatomy and arrived at the main goal of taking a stagnant process and bringing motion into it."

The company chose a lateral scissor design for one of its adjustable-height desktop stands for computers, because it provided leverage and stability without moving the device toward or away from the user.

They're just some of the new products that have come out of the innovation hub at the company's Itasca headquarters. The family-owned company, founded in 1917, has 2,000 employees in 17 locations around the world.

"Almost all of our product development is done in-house," Fellowes says.

The company weathered the pandemic surprisingly well because many of its products helped employees make the switch to remote work. Also benefiting is its air-purification business, which was launched in 2013, after executives noticed people with asthma and allergies had air purifiers at home but not at work.

"We're a hundred-year-old business," Fellowes says. "If you have things that just continue, one day you're going wake up and they're not relevant. You have to be constantly purging or challenging the way that you do things in order to stay relevant."



6. UPTAKE TECHNOLOGIES

What it does: Data analytics software | **Patents last year:** 16

Uptake Technologies keeps dialing up new algorithms to help industrial customers figure out what's not working.

The company developed ways to predict when equipment—such as wind turbines, locomotives and trucks—would fail based on historical patterns. Now it's come up with ways for companies to spot underperforming equipment, such as wind turbines in a large wind farm. It's just one of the patents that has put Uptake on Crain's Most Innovative Companies list for the [second year in a row](#).

"The focus is on overall productivity, making sure that each turbine can produce all the energy it's capable of," says Brian Silva, director of data science at Uptake.

Companies can increase the output of a wind farm by 1%-2% by identifying turbines that aren't producing as much power as others around them. The improvement can translate into \$250,000 to \$500,000 in additional revenue annually for a wind farm.

It's a big deal to Uptake's customers, such as [Berkshire Hathaway Energy](#).

Uptake says it's also saving money for customers, such as trucking company United Road, by predicting equipment failures through data analysis and modeling. "They reduced roadside breakdowns 26%, which works out to about \$3,400 per truck," Silva says.

As companies use more sensors to monitor equipment, they've got access to more data about individual machines. The challenge for Uptake is gathering that data and figuring out how to make sense of it by using algorithms to focus on specific trends quickly enough that companies can act on them.

Uptake, which was founded by startup entrepreneur and early Groupon backer Brad Keywell, has been awarded 44 patents since it launched in 2014, says CEO Kayne Grau.



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7. SAGE PRODUCTS/STRYKER

What it does: Medical products | **Patents last year:** 10

Sage Products has long history of innovation, stretching back to sharps containers for needle disposal in the early 1980s.

These days, it's reinventing the way hospital patients are moved, using inflatable sheets with handles and straps, reducing strain and injuries for staff. Sage also makes self-dispensing, single-use toothbrushes and oral-care products for patients who are unable to brush their own teeth.

"Sage has been consistently filing new patent applications and creating new product categories in patient safety, infection control and preventative care," says James Malackowski, CEO of Ocean Tomo.

The company, based in Cary, was founded in 1971 by Vince Foglia and Paul Hills. Over time, it created a highly respected new-product development operation, moving into new businesses. Sage created a line of patient hygiene and preoperative products, along with devices related to reducing pressure sores.

Sage grew to about 700 employees and nearly \$300 million in annual sales in 2012, when it was acquired for \$1 billion by Chicago-based private-equity firm Madison Dearborn Partners.

Stryker, a medical-device company based in Kalamazoo, Mich., [acquired the company](#) for nearly \$2.8 billion in 2016.

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8. MARS WRIGLEY

What it does: Gum and candy | **Patents last year:** 6

In the gum and candy business, what you leave behind is becoming almost as important as what you consume.

"People will not only choose the product based on taste, but also on packaging," says Chris Rowe, Chicago-based head of global R&D at Mars Wrigley, the world's largest gum maker. "They want

products sustainably packed. We've invested millions in that over the past few years."

The team at Wrigley, which works from a facility on Goose Island, is credited with a half-dozen patents last year, ranging from gum to packaging. They're continuing a long history of innovation at Wrigley, which was acquired by Mars in 2008. Its breakthroughs include sugar-free gum, envelope-style flat packages and the introduction of plastic flip-top containers for gum.

R&D workers at Mars Wrigley are coming up with ways to make packaging for everything from chocolate to gum more eco-friendly. "People are consuming our products on the go," Rowe says. "It's not always easy to find a place to recycle them."

The company recently launched a product in Europe with packaging that was 90% paper-based. It also came up with new technology, which M&M's debuted in Europe, that is more desirable to recyclers because it uses a single layer of packaging rather than multiple layers.

It's the type of broad innovation—from products to processing and packaging—that comes from the company's Chicago R&D center, where headcount is expected to increase about 10% in the next year.

"Chicago will get more and different types of innovation in the future—things that might play out over a longer time period," Rowe says.



9. CHAMBERLAIN GROUP/DUCHOSSOIS GROUP

What it does: Garage door openers | **Patents last year:** 18

A decade ago, Chamberlain Group paired the garage door opener with the smartphone.

Since then, its myQ smart hub added Wi-Fi, Amazon Prime, a camera and a doggie door.

The Oak Brook-based company, part of Duchossois Group, has been a pioneer in smart home technology. It's likely one of the reasons that private-equity firm [Blackstone is paying \\$5 billion](#) for the garage door company. Chamberlain received 18 U.S. patents last year for innovations related to its garage doors.

"They've been the leader for a very long time, since back when the smart home wasn't even a market," says Adam Wright, a senior analyst at International Data Corp. in Boston. "MyQ was the first available, do-it-yourself solution. Until very recently, you'd be hard pressed to find a Wi-Fi-enabled garage door that wasn't from Chamberlain or LiftMaster. MyQ was the only solution for a very long time."

MyQ is part of the broader smart home market in the U.S. that IDC estimates will top \$100 billion this year.

"Looking forward, I would suspect Chamberlain is looking to monetize the smart home market beyond the garage door opener," Wright says.

10. WILSON SPORTING GOODS

What it does: Sports equipment | **Patents last year:** 15

To develop a new tennis racket for today's players, Wilson reached back to an old idea.



The sporting goods manufacturer wanted to make the head of the racket flex laterally to adapt to a new generation of players who are stronger and hitting balls with a much more vertical swing. The additional flex allows the ball to stay on the strings slightly longer, producing more top spin.

So the company changed the way it assembled the layers of carbon fiber used to make the racket. As aircraft and race car makers have known, carbon fiber gets much of its strength and rigidity from the way the fibers are laid out before they're fused together.

The result was the Clash racket, which since it was introduced two years ago has become the bestseller in the world.

It's just one of the innovations found in patents issued to Wilson last year, which has returned the company to Crain's Most Innovative Companies list [for a third time](#). Other advances include baseball bats with adjustable knobs, making it easier for batters to choke up, and adjustable end caps with different weight inserts, which can change the feel of bat as it's being swung.

The company has about 70 employees at its [state-of-the-art innovation center](#) in Rosemont, where it can deconstruct the physics of a tennis ball or racket.

The innovation behind the Clash racket came from Bill Severa, the company's director of advanced R&D for racket sports. "He has been playing with the concept since the early 90s," says Bob Thurman, vice president of Wilson Labs. "It required us to work with our manufacturing partners to manufacture it completely differently."

Thurman says the pace of innovation is accelerating, putting pressure on R&D teams to innovate faster. "Consumers' needs and wants shift very rapidly," he says. "A product used to stay in market for three to five years. Now it's one or two years."

Editor's note: *This story has been corrected to reflect the correct number of patents for NuCurrent.*

Chicago's 50 Most Innovative Companies

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Companies with the most patents

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