The tightest of deadlines, zero chance of getting a byline, a readership of perhaps only a handful of people—even with jobs in journalism becoming increasingly scarce, such conditions might tempt reporters to surrender their press passes. Yet just across the Chicago River from Tribune Tower, a reporter hums away without complaint, crafting a lively and accurate article about a sports event that ended one second ago. The article even cites your Little Leaguer for making the winning play.

“We want to make the information that comes to you more interesting,” says Larry Birnbaum, associate professor of electrical engineering and computer science at McCormick and chief scientific adviser for Narrative Science, a media startup with the slogan “We turn data into stories.”
“People like stories,” says Kris Hammond, professor of electrical engineering and computer science at McCormick and chief technical officer at Narrative Science. “Readers want insights. We use technology to turn the numbers into stories with a narrative arc and a point of view.”

Narrative Science, cofounded by Hammond and Birnbaum with chief executive officer Stuart Frankel, commercializes technology developed in a partnership between McCormick and Northwestern’s Medill School of Journalism, Media, Integrated Marketing Communications. The McCormick-Medill efforts have included courses, research, and ongoing projects in the Knight News Innovation Laboratory. “With a top engineering school and a top journalism school,” says Birnbaum, “Northwestern was one of the few places where this could have been possible.”

From ‘toon newscasters to articles that write themselves

The partnership came together after John Lavine, the dean of Medill, learned about a project of Hammond’s called News at Seven. With support from the National Science Foundation, Hammond and graduate students in Northwestern’s Intelligent Information Laboratory created a system that collects information and generates a virtual newscast anchored by avatars. Refinements to the system allowed the talking ‘toons to banter with one another and swap opinions about films. Lavine saw the possibility for a promising exchange between McCormick and Medill. Those joint efforts now take place under the umbrella of the Medill McCormick Center for Innovation in Technology, Media, and Journalism.

The two schools first worked together on a spring 2009 course called Innovation in Technology and Journalism, taught by Hammond and Birnbaum alongside Medill faculty members Jeremy Gilbert and Rich Gordon. The goal was for computer science students and journalism students to learn from one another in order to create new media systems. The course is now
People like stories. Readers want insights. We use technology to turn the numbers into stories with a narrative arc and a point of view.

Kris Hammond

Will “robo-copy” replace reporters?

Perhaps error-prone copy editors deserve to be on the bread lines, but what about hard-working reporters? Putting reporters out of work was never the intent of the team behind StatsMonkey—which was created, after all, by journalists working with computer scientists. Neither is the management of Narrative Science plotting to diminish the job market for journalists.

“The sweet spot for us is what isn’t being covered,” says Nate Nichols, lead architect at Narrative Science, who earned a PhD under Kris Hammond. “Without our technology,” says Birnbaum, “these are stories that would not have been written. The readers would have missed out on something.”

Narrative Science produces some 15,000 stories a week for its roster of clients. Among them is GameChanger, a statistics management website for youth, high school, and college baseball and softball. One popular GameChanger app texts updates about Little League games to parents. “It used to be just the box score,” says Nichols. “By using our technology, [GameChanger] can send a complete write-up. If you’re the kid’s grandma, you’ll want to print it out and put it up on the fridge.”

If grandma speaks only Polish, Narrative Science can generate the article directly in Polish, says Hammond. What if her grandchild’s team loses? The article can be written from the losing team’s point of view, spotlighting an individual player’s moves.

Two sample Narrative Science headlines/tweets and ledes for a November 2010 men’s basketball game between the University of Wisconsin Badgers and the Prairie View A&M University Panthers, in which the Badgers were victorious, demonstrate the difference.

Badger fans read: Jon Leuer scores 24 and Josh Gasser adds 21 as Wisconsin crushes Prairie View A&M 99–55

Panther fans read: Simpson scores 14 but Prairie View A&M can’t contain Wisconsin in 99–55 loss

How does a computer know if a baseball game is a rout? “It looks at the data, whether the score is lopsided or if there’s a lot of back and forth, with the lead changing hands,” answers Hammond. “The system pulls in the data and asks, What’s the angle? If it’s not in the data, we won’t see it, but we’re pulling in more data all the time.”

Hammond says that Narrative Science can spin out a story in any area that is driven by data. The company’s clients include not only sports-related enterprises but also financial and real estate publishers in need of earnings reports, stock analyses, or specialized market reports (see sidebar). “We have different narrative arcs for different areas,” explains Hammond. “Our journalists look at what a story is about.” On staff at Narrative Science are Medill graduates John Templon and Nick Allen, both veterans of that first joint McCormick-Medill class. Two more Medill graduates, Andrew Paley and Dan Platt, recently joined the company. Rather than putting journalists out of work, Narrative Science is hiring them.

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Sending you the news you can use

Generating a story about a Little League game for a Polish grandmother is one small example of the big push to personalize information. “We realized you don’t want 100 search results or even 10,” Birnbaum says about ongoing research in computer science. “You want one result, something that synthesizes the information you need right now. We want to make artificial intelligence more contextually aware. Instead of your searching, the system pushes the information directly to you, in a form you can use.”

In the Knight News Innovation Laboratory, researchers at Northwestern are pursuing several media projects that do just that, using technology developed in the associated InfoLab. A joint McCormick-Medill initiative, the Knight Lab is the first of its kind in the country. It was created in February 2011 with support from the
University and a four-year $4.2 million grant from the John S. and James L. Knight Foundation, which supports journalism and media innovation. Veteran newspaper and television journalist Michael Silver heads the lab, where researchers work to develop new technologies for reporting, analyzing, and disseminating news.

The first thing that greets a visitor to the Knight Lab—on the second floor of the Ford Motor Company Engineering Design Center—is an installation of four flashing screens underlined by news crawls, the work of computer science graduate student Patrick McNally. Dubbed Patchwork Tweet, McNally’s project is a mash-up of current topics of interest on Google and up-to-the-second Twitter commentary. McNally explains that the hyperkinetic display is actually a way to slow down and focus online information. “The Twitter stream is too fast,” says McNally. “By the time you’ve aggregated it, the world’s changed. Patchwork Tweet feeds you the most interesting topics right now.”

In a nearby room computer science graduate student Lisa Gandy fine-tunes Congressional Closeup, a system she created to monitor votes in the US Senate. “We look at anomalous votes,” says Gandy. “Why did a senator depart from the expected position on a particular vote?” Using data categorized by political scientists, Congressional Closeup checks to see if political factors—employment in the district or the influence of political backers—might explain the anomaly.

Working at a computer next to Gandy, graduate student Shawn O’Banion is helping the Chicago Tribune, which is working with researchers in the Knight Lab, to determine how to target information to consumers. “How can the Tribune find out what interests you?” asks O’Banion. His solution, Twitter Profiling, monitors a person’s Twitter feed to build a personal profile and generate a personalized news page.

“There’s more and more data all the time,” says Birnbaum. “It’s easy to collect it, but the question is how to make it actionable. We want to present people with information targeted to their interests, in a way that’s useful to them.”

Same data, two different stories
To demonstrate how its technology can generate stories with very different tones, Narrative Science supplied two earnings reports based on the same data. The tone of the first is straightforward, just-the-facts-ma’am:

**Cooper Tire & Rubber Misses Estimates**

Cooper Tire & Rubber Co. (NASDAQ:CTB) reported a lower net income in the second quarter compared with a year earlier, falling below analysts’ estimates.

- Net income fell 40% to $11.5 million or 18 cents per share, short of the mean analyst estimate of 26 cents. A year ago, the company reported net income before extraordinary items of $19 million or 30 cents per share.
- Revenue rose 14.7% to $922.2 million from the year earlier quarter against an estimate of $979.9 million in revenue.
- Gross margin fell four percentage points to 7.9% from the year earlier quarter. Over the last five quarters, margins have contracted on average 3.4 percentage points per quarter on a year-over-year basis.

In the second example the Narrative Science reporter cuts loose, becoming as irreverent as a human reporter getting slaphappy as a deadline approaches:

**Cooper Falls Short on Revenue and EPS**

Cooper Tire & Rubber Co. (NASDAQ:CTB) came up a day late and a few million dollars short of expectations in both revenue and income.

- The company booked revenue of $922.2 million, an increase of 14.7% over the same quarter in the prior year, but well short of The Street’s prediction of $979.9 million. On top of that, EPS of 18 cents per share was not even within shouting distance of the estimated 26 cents per share.
- So how does a company see revenue rise, but come up short on the bottom line? Here’s a little lesson in a thing called shrinking margins: Revenue may have risen, but when your cost of sales figure climbs more (19.9% from the year earlier), that results in gross margin shrinking by four percentage points and the bottom line taking a 40% hit.

And after this AWESOME quarter, I’m sure the CEO will clear things up for us: Roy Armes, Chief Executive Officer, commented, “The industry is currently being challenged by two forces: the drop in consumer demand and high raw material prices. These challenges are not new to the tire industry, and we have historically found ways to successfully address the issues. While these forces may continue to put pressure on the industry in the short term, we are optimistic about our ability to successfully compete. We are well positioned to take advantage of opportunities to grow profitably.”

And from the possibly useful information department: Last quarter marked the fifth straight quarter that the company saw shrinking gross margins as gross margin fell four percentage points to 7.9% from the year earlier quarter. Over that time, margins have contracted on average 3.4 percentage points per quarter on a year-over-year basis.

On the bright side, over the last five quarters revenue has increased 18.2% on average year over year. The biggest increase came in the second quarter of the last fiscal year, when revenue rose 27.3% from the year earlier quarter.