Wall Street's

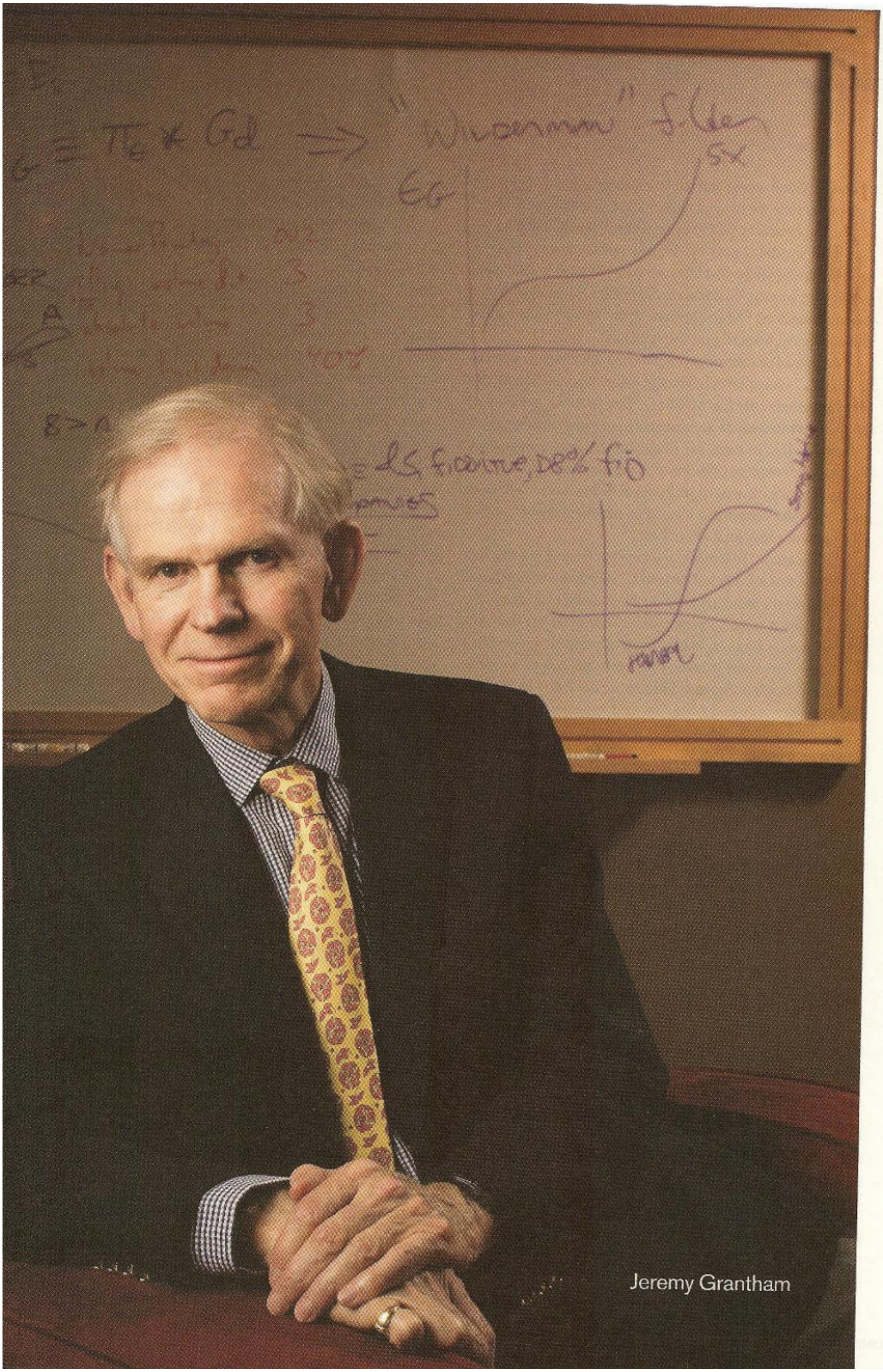
Rocket Scientists

By Nicole Bullock

Quantitative investors use their mathematical genius to outsmart the market. Here are five stocks that fit their formulas.

There are no TVs blaring CNBC at the offices of Grantham, Mayo, van Otterloo overlooking Boston Harbor. Nary a stock ticker is in sight. It's even tough to find a copy of *The Wall Street Journal.* Though the firm manages more than $90 billion, the atmosphere is more MIT than NYSE. Whiteboards covered with mathematical formulas line the walls in comfy areas called playrooms, where engineers, economists and math whizzes hash out theories on the financial markets. It's on these walls that GMO figures out how to make money, which it has done quite handily over the past two

Photograph by Jason Grow



Jeremy Grantham

decades. While some portfolio managers brag about the amount of time they spend visiting the companies they invest in, the big brains at GMO brag about how they don't.

"Our models never fall in love with a stock, which is what happens when you follow a company for years," says Chairman Jeremy Grantham. Adds Ben Inker, director of asset allocation: "Management's job is to get you to like the company, not tell you the truth."

So instead of listening to what they dismissively refer to as "noise," Grantham, Inker and other so-called quantitative investors trust the numbers. The theories developed on those whiteboards are transformed into complex algorithms, which, in turn, are programmed into computers. By cross-referencing millions of pieces of data—taking into account more information than mere mortals could ever process—the computer identifies market opportunities and spits out buy and sell tickets.

"You can run [the models] on every company, every second while on holiday in Bermuda," deadpans Grantham. "We can do the stock picking without using our brains for a day or for a year." Jokes aside, the quants, as they are affectionately known, do have an advantage over other investors: Emotion is removed from the equation. Fear and greed don't compute. That came in handy in the late 1990s, when computer models said Internet stocks were wildly overpriced. While other investors were giddy over their paper riches, GMO warned that the high valuations didn't represent a "new paradigm," but a market bubble about to burst. While Grantham lost more than a few clients, those who stayed loyal had the last laugh.

It works the other way, too—when other investors are running scared, the quants are buying. In the fall of 2002, when most of Wall Street was despairing and stocks were plunging to new lows every day, the models at Houston-based quant shop Bridgeway were flashing a buy on Internet stocks. On average, the 11 funds in Bridgeway's stable have returned 13 percent a year over the past five years and a whopping 26 percent in the past 12 months.

The quantitative approach to investing originated in academic circles as Nobel Prize winners Harry Markowitz and William Sharpe studied the tradeoff between risk and return. They came up with a recipe—now known as the Sharpe ratio—to quantify it. Borrowing on that research, a handful of investors in the late 1960s began experimenting with what applied mathematics and computer science could do for investing. "We were looking at various ways of appraising value, and quant investing grew out of that," says Dean LeBaron, who along with Grantham founded Batterymarch Financial Management in 1969. A key moment came in 1978, when a blizzard hit Boston, effectively shuttering every investing shop except Batterymarch—where the computers continued to trade. "We let them run hands off for about a week," LeBaron says. "It was running better by itself than with us watching it."

It took a while for the approach to catch on. "When we first started out, the conventional wisdom was that it was impossible to design a trading strategy that would systematically beat the market using publicly available information," says David Shaw, another quant pioneer, who founded D.E. Shaw in the late 1980s. "The early results of our own research, though, showed that there were, in fact, certain small imperfections in the pricing of various securities that could be exploited to generate unusually large returns." A young computer whiz working for Shaw thought another interesting use for high-powered computers would be to sell books on the Internet; Jeff Bezos quit and founded a company called Amazon.com.

Quant investing is not something you should try at home. Even if you had the computing power and could somehow pry one of the closely guarded algorithms from its creators, it might be out of date by the time you used it. As buyers and sellers identify pricing imperfections,

REVENGE OF THE QUANTS

Computer models find these stocks more attractive than the rest of the market does.

Company (Ticker, Price)	Market Value ($bil)	2006 Revenue ($bil)*	2005 EPS*	2006 EPS*	2006 P/E	Quants say...
AstraZeneca (AZN) $46.05	74	25	$2.79	$3.14	15	Wall Street underestimates earnings power.
Chevron (CVX) $57.29	129	210	7.01	7.62	8	Big oil stocks are cheap, and energy may remain expensive.
Goodyear (GT) $13.80	2	21	1.27	1.52	9	Investor jitters about the past are blinding them to the turnaround.
Microsoft (MSFT) $24.57	263	44	1.12	1.31	19	With the rest of the market loading up on risk, take cover in big, safe stocks.
Taiwan Semi (TSM) $7.91	39	9	0.53	0.62	13	Set for earnings surprises when chip demand rebounds in 2006.

Data as of 10/18/05. AstraZeneca and Taiwan Semiconductor are American Depositary Receipts. Microsoft fiscal years end in June. *Consensus estimates. SOURCE: THOMSON BASELINE the market adjusts. "If a quant model is successful, the opportunity disappears," says John Chisholm, an engineer who once worked on missile guidance systems and is now cochief investment officer at Acadian Asset Management. "The market is adaptive, so a successful quant process has to be adaptive." What worked in the past may not work today. Acadian's quantitative funds have been beating the market since the company first put money to work in 1988.

We surveyed the best quant shops to find out where the dials are pointing. After a bit of due diligence to narrow down the list, we were left with five stocks the machines say are poised to outperform.

AstraZeneca

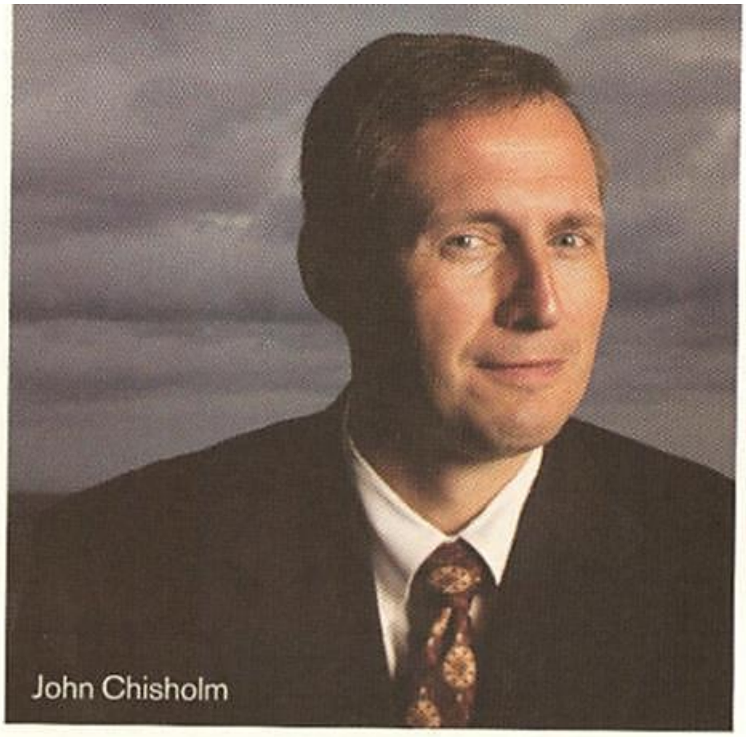
(AZN, $46)

BIG U.S.-BASED PHARMACEUTICAL companies are hurting as generic competitors take their business and because there are few promising drugs on the horizon. But across the pond, things are looking up. Shares of London-based AstraZeneca have climbed nearly 30 percent this year, and the computers say the stock is still a buy. At Acadian, a modeling tool called the optimizer ranks the company highly on characteristics such as the quality of its earnings, while another model suggests that Wall Street is underestimating the company's earnings power. AstraZeneca has been on a tear lately, thanks to cost-cutting and high sales for drugs such as acid reflux treatment Nexium and schizophrenia drug Seroquel, which together brought in $3.6 billion in the first half, up 22 percent from the previous year. Overall, sales were up 12 percent and earnings up 37 percent. "The cost structure doesn't go up with volume," Chisholm says, which bodes well for future profits. Shares are trading at 16 times this year's earnings—compared with 15 for global pharmaceutical companies. "It's not exceptionally cheap," Chisholm says. But given its anticipated profit growth, it's a bargain. For 2005, analysts expect the company will earn $4.5 billion, or $2.79 per share. That's a gain of 32 percent versus the previous year, and Acadian thinks AstraZeneca will do even better.

Goodyear Tire & Rubber

(GT, $14)

GOODYEAR IS A TURNAROUND story with traction. After nearly filing for bankruptcy a few years ago, the firm has strung together seven straight quarters of year-over-year earnings gains, thanks to price increases and a product shift to emphasize more-expensive, high-performance tires. The company, which started out making carriage



John Chisholm

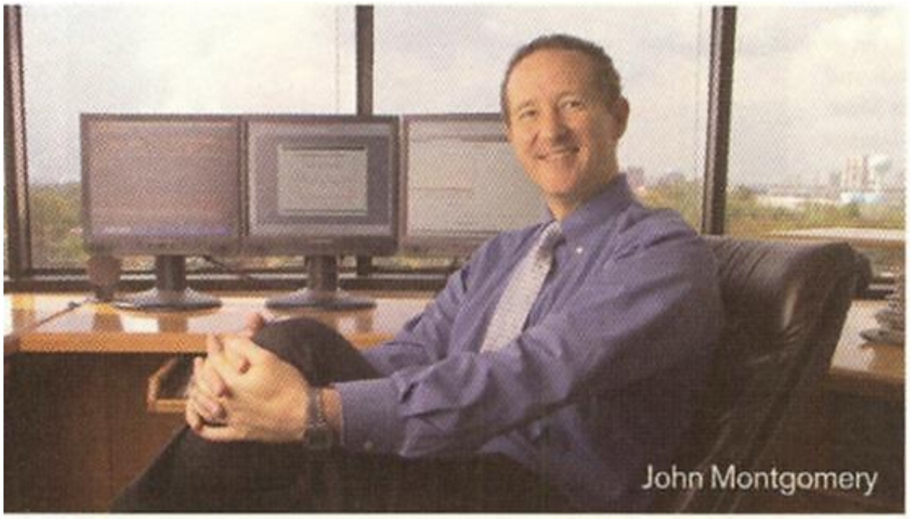
tires over a century ago, has also cut $1 billion in costs in three years, boosting profit margins to 6.2 percent for the first six months of 2005, compared with 2.6 percent in 2002. It plans to cut another $1 billion in costs by 2008 by closing high-cost production facilities and selling its engineered products unit, which makes such things as hoses and conveyor belts.

But even though Wall Street estimates a big increase in earnings this year, bad news has weighed on the shares. In addition to a huge debt load and an underfunded pension plan, the company is dealing with a Securities and Exchange Commission investigation of past earnings restatements. The most recent speed bump: pinched supply of carbon black—a raw material in rubber tires—which forced Goodyear to temporarily cut production by 30 percent. It's enough to make some investors queasy, but Bridgeway founder John Montgomery, who has 5 percent of his category-beating Aggressive Investor funds in the stock, isn't losing sleep. "The supply and demand for carbon black isn't in the model," he laughs. "It finds stocks that have been beaten down, and where there's a fundamental turnaround, but Wall Street doesn't believe the numbers."

Chevron

(CVX, $57)

THE PRICE OF CRUDE OIL doubled in 18 months, and energy stocks have powered higher along with it, leaving investors to wonder if they are witnessing a new world order of high energy prices, or just another bubble about


John Montgomery

to burst. The question is felt acutely at GMO, where they admit to "hero worshiping" the concept of mean reversion, which holds that, over time, prices revert to the long-term average. Mean reversion, of course, suggests that oil prices should fall. But now the same strategists who refused to buy into the Internet bubble say the high cost of energy constitutes an actual paradigm shift: a permanent move higher. It's too early to know what the new price range will be, but in the meantime, Grantham suggests investors not make any huge bets against the commodity. "You want to be prepared for anything," he says.

Within the sector, GMO's research suggests the best investment opportunities are in the large oil companies, which haven't kept pace with gains seen by smaller, riskier players. Chevron, the second-largest oil company in the U.S., is up 9 percent this year, versus a 21 percent rise for the S&P 500 Energy index. It's trading at only eight times next year's expected earnings, which suggests Wall Street thinks that earnings growth will slow. In addition, Chevron shares have been weighed down both by the high price the firm paid for oil company Unocal—$20 billion—and its large presence in the hurricane-battered Gulf of Mexico. But earnings are up 30 percent in the past 12 months, to $13 billion or $5.88 a share, and with a generous 3 percent dividend yield, Chevron is sharing the wealth. "It's one thing if they have the cash," says GMO portfolio manager Chuck Joyce, "another if they give it back to you."

Microsoft

(MSFT, $25)

THE QUANTS AT GMO cannot be described as bullish. "For the first time in my career, everything is overpriced—from emerging-market debt to large-cap value stocks," Grantham says. So GMO recommends that equity investors take cover by stashing their money in big, safe companies. That's why GMO's Joyce likes Microsoft. The firm has a near monopoly over a huge market. It uses shareholder money efficiently, as measured by its return on equity of 23 percent—anything over 15 is considered good—and it practically mints money. The company is on track this fiscal year to earn $14 billion on sales of more than $44 billion.

Despite the company's rock-solid financials, investors seem to have forgotten that Microsoft exists. Shares sell for the same price they did in 1998, though the company earns more than twice as much money as it did back then. And for good measure, Microsoft is about to release a new operating system and a host of other upgrades. "This is one of the best low-risk, highly profitable companies," Joyce says. "The market is just bored with it." Thanks to its relatively modest P/E of 19, Microsoft should hold up if GMO's bearish predictions prove accurate.

Taiwan Semiconductor

(TSM, $8)

THE WORLD'S FIRST and largest semiconductor foundry, Taiwan Semiconductor makes chips for firms such as Broadcom, which don't own their own plants, and companies like Philips and Motorola, which want to increase capacity. Its size and cutting-edge technology have helped the company offset some of the cyclical ups and downs inherent in the chip business. Nonetheless, it has been hurt by weak sales this year, and recently, investors have become nervous about competition in the form of foundry upstarts in mainland China. As a result, Taiwan Semi is trading at 13 times next year's expected earnings, compared with a historical average of 26 times. But Acadian's Chisholm sees the makings for earnings surprises ahead. "There had been a dip in pricing and not as much demand this year, but that's already priced into the stock," he says. "Our expectation is for a significant upturn in the second quarter of 2006, with chip prices recovering faster than expectations." There's some evidence of an upturn already: In September, Taiwan Semi posted its first sales increase in eight months. And as the market improves, the firm's manufacturing prowess may give it a leg up on the Chinese competition. It has more experience manufacturing cutting-edge chips that hold more data or have better processing capabilities—in other words, the chips that people pay more for.

Photograph by Pam Francis