



## FOCUS TOPIC - HIGH-FREQUENCY TRADING

# Geeks trump alpha males as algos dominate Wall Street

- \* Analytical programmers have replaced boisterous traders
- \* High-frequency trading makes up 60 pct of all trading
- \* Computer programs not foolproof

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By Phil Wahba and Emily Chasan

Wall Street traders aren't what they used to be — they're not even on Wall Street anymore.

The days of swashbuckling backslappers on the floor of the New York Stock Exchange have given way to an era of trading dominated by analytical technical whizzes whose computers may be running from a town in deepest New Jersey or Texas.

While street smarts and an ability to socialize were crucial to successful floor traders, today's trader needs math and computer science, and quite possibly a PhD.

And that has to be coupled with coolness, organization and logic to sift through masses of trading data each day and think about how to shave microseconds off trades.

“The old markets were based on retribution — I knew who you were and you would trade with me again and again, and if you didn't treat me right I wouldn't trade with you,” said Al Berkeley, chairman of electronic brokerage company Pipeline Trading Systems and former vice chairman and president of the Nasdaq Stock Market.

“The difference is anonymity. If you play a game with the same people over and over again, you reach an understanding about what's acceptable. If the game is completely anonymous, there are no rules between people, there are only rules imposed by the marketplace.”

The outsized growth of high-frequency trading, dark pools of liquidity and high-tech computer algorithms has fundamentally changed the game on Wall Street — and the psychology of those who work there.

Traditional floor trading “really is an alpha-male activity,” said Brett Steenbarger, and an associate professor of psychiatry at State University of New York at Syracuse and an expert in

the psychology of trading. “You get these highly competitive people taking a good amount of risk ... It’s like being in a locker room. In contrast, computer programmers are almost like a think tank.”

Now, with high-frequency trading representing some 60 percent of U.S. stock trades, the atmosphere appears to owe as much to Arthur C. Clarke and artificial intelligence as to Gordon Gekko and the 1987 movie “Wall Street.”

“They are introverts, some are socially awkward, and they don’t seek publicity. They are the type of guys you would see at a Star Wars convention,” said Sang Lee of Aite Group.

High-frequency traders are practical, problem-solving people with an engineering background. “It’s a very intellectually challenging field — it’s extremely exciting to develop a strategy, implement it and see it make money,” Steenbarger said.

And it can be very lucrative, with a programmer typically making 10 percent commission on the money his model generates, said Irene Aldridge of Able Alpha Trading, a one-time quantitative specialist at CIBC in Toronto who has a forthcoming book on the practicalities of high-frequency trading and algorithmic strategies.

The best programmers can make tens of millions of dollars a year. That was even the case during last year’s financial crisis, as great volatility offered both risks and opportunities for high-frequency traders.

“It’s a highly technical, mathematical game,” Berkeley said. “They are playing a very precise game of statistically estimating and predicting over the next three to five seconds whether there is going to be any liquidity in that stock and where it is. And how they can take it without being seen and without leaving any tracks.”

Low key and somewhat awkward, these introverted but brilliant traders look up to James Simons, the Renaissance Technologies fund manager known as the “King of the Quants.”

A media-shy mathematics professor, the 71-year-old Simons has made billions of dollars by making the right bets on technical trading strategies. In January he will retire from his firm, which manages \$17 billion in assets, but will leave an indelible mark on the industry.

In fact, the Simons model has made “PhD” some of the most common letters seen following the names of today’s top traders. Expert mathematicians, physicists, computer scientists, engineers and economists have used technical skills to excel in trading. Among new recruits, Wall Street experience isn’t valued nearly as much as programming aptitude.

**“These are not your Harvard B-school grads, per se,” said Robert Olman, president of Alpha Search Advisory Partners, an executive search firm for hedge funds and proprietary trading shops.**

**“They often have dual degrees, bachelors and masters. One degree is going to be computer science, and the other degree might be financial engineering, math, physics,” he said.**

## MILLISECONDS AND MICROSECONDS

Traders have discovered that mathematical techniques can help them gain more control over their trades, said Berkeley. They hunt for trading venues that give them the fastest trades at the best price without exposing their strategies to rivals.

An obsession with milliseconds has led high-speed traders to focus on “co-location,” where trading shops try to place themselves as close as possible to an exchange’s data centers.

High-frequency trading shops that focus on options have sprung up in Chicago, near the options exchanges, and in New Jersey, where trading venues like BATS and Direct Edge are located and where the Nasdaq <NDAQ.O> and New York Stock Exchange <NYX.N> house their data centers.

“High-frequency traders use the computer and the speed of the computer to take control of the situation,” said Pipeline’s Berkeley. “It’s just like having a high-speed fighter airplane versus a slow-speed one. If I can turn inside your turning radius, and if I’m faster than you are, I can win every time.”

The essence of algorithmic trading, Berkeley says, is to avoid trading at a bad price. Traders get as much control as possible over how to enter an order, cancel an order, change the size of an order, or find out any other information that will help them stay ahead.

“It is all about converting the fact that you have very high speed and very precise control of your order into an advantage,” Berkeley said. “If you don’t get the trade you want, your order is canceled. You don’t sit there even for a nanosecond.”

However, high-frequency traders’ computer programs are not foolproof.

John Malitzis, vice president of market surveillance at the New York Stock Exchange’s oversight body, told a conference in September that he has seen examples, both in U.S. markets and elsewhere, of computer algorithms malfunctioning. He calls them “algos gone wild.”

High-frequency traders are also often discreet and secretive. Proprietary trading shops and banks spend millions developing complex algorithm strategies and want to keep them in a black box well away from their competitors.

“The social skills traditional traders have needed to serve clients are disappearing,” said Aldridge, herself an ex-trader at a “prop shop.”

“There was a lot more interpersonal communications on the trade floor,” she said. “You see little of that at all anymore, because most of it is by computer.”

And that can be a risk in itself, some say. While the computer traders are more coolly analytical, proprietary shops have had to put in control mechanisms to rein in the brilliant programmers who are sometimes so immersed in their reams of data that they lose perspective.

“They are so immersed in the market activity they don’t really have a panoramic (view),” Steenbarger said.