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## Ken Griffin's Hand-Picked Math Prodigy Runs Market-Making Empire

Citadel Securities CEO Peng Zhao left for college at age 14, caught Griffin's eye early in his career and built systems now mopping up market share

by [Katherine Doherty](#)

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Among all the tales Wall Street leaders tell of pivotal moments that led them to their powerful perches, Citadel Securities Chief Executive Officer Peng Zhao's may be the only one that involves sifting through trash.

It starts with youthful hubris and ends as a parable about perseverance – something the firm will need to realize its ambitions amid a slew of proposed US regulations.

Back then, Zhao was a second grader at what he describes as a middling public school in Beijing when his class received two coveted tickets to take a test to enter a prestigious math olympiad. One naturally went to Zhao, the top student, who promptly lost it. No need to worry, he told his father, he didn't want to go, and if necessary he could ask the school for the other kid's ticket. His dad wouldn't have it.

They ended up at a neighborhood dump, pouring garbage onto the ground and rummaging through. Day turned into night. Zhao pleaded to call it quits. His father refused.

As they sifted the mountain down to its final remnants, they found the missing ticket. Zhao took the exam, passed and eventually entered an educational fast-track that turned him into a 14-year-old college student and carried him to the heart of the US financial system.

Among the CEOs of Wall Street's key firms, Zhao has kept an unusually low profile. He runs one of the most important US market-makers, which matches buyers and sellers in roughly one out of every five US stock trades, generating about \$7.5 billion in revenue last year. The firm, established in 2002, aims to grow in Asia and Europe, and further expand beyond stocks and options to play a bigger role in fixed-income and rates trading, taking market share from Wall Street banks. And it has been at the forefront of pioneering direct listings, the alternative to initial public offerings with burdensome road shows.

Yet even inside his industry and among the firm's most ardent critics, Zhao, 40, hardly draws attention. That's thanks in



Peng Zhao at the Citadel office in New York. *Photographer: Sarah Blesener/Bloomberg*

part to the shadow cast by the company's outspoken billionaire founder, Ken Griffin, who also owns Citadel LLC, the \$58 billion hedge fund manager.

Griffin is constantly in the spotlight – speaking before US lawmakers, on television, to conferences and college graduates – often defending Citadel Securities' growing role in markets and its controversial gathering of equity and options orders from retail brokerages through a practice known as payment for order flow. In recent months, the firm has been pushing back on parts of the Securities and Exchange Commission's proposed overhaul of market rules that threatens to curb its role handling roughly a third of retail stock-trading volume.

Griffin has stirred further controversy by aligning himself with Republican Florida Governor Ron DeSantis and recently uprooting his businesses from Chicago to Miami, embracing the city's campaign to become a low-cost, subtropical financial hub competing with New York.

Yet behind the scenes, Griffin visits Citadel Securities rarely, keeping tabs remotely, according to people close to the firm. Instead it's Zhao who is up to his elbows in

the firm's efforts to rewire Wall Street markets with new systems for handling orders from institutional and retail clients.

"If you want to make a trade, we should be the first name that comes to mind," Zhao said in a rare interview at his office, still in Chicago.

If – or when – Citadel Securities eventually sells shares to the public, it would put an overdue spotlight on a CEO whose formal receipt of that title in 2017 wasn't even marked by a press release.

"The only thing he hasn't done a ton of is have a big public profile," said Jamil Nazarali, a former senior Citadel Securities executive who's now CEO of EDX Markets, which is backed by his former firm.

### Video Games

Zhao's lack of notoriety even in his own industry is all the more striking because of the unusual story behind his rise – starting with that grade-school math competition.

Passing that made him a candidate for an accelerated program that gives 10-year-olds a chance to finish their high school degrees over four years. But first Zhao needed to be evaluated at a two-week

camp where, on the first day, he happened to sit next to his future wife.

In a crucial test, the camp organizers led students to a track and gave them a simple task: move. Applicants were left guessing at how to impress observers. Some sprinted and petered out. Others jogged or walked for what turned into a two-hour slog. Those who lasted, as Zhao did, demonstrated persistence and gained entry to the program.

Zhao developed a competitive streak. And at 12, he discovered his calling while reading a newspaper on the Beijing subway.

An article described how physicists, mathematicians and computer scientists were developing systems to beat Wall Street professionals in predicting market moves. He was enthralled by the high stakes and potentially massive rewards.

“It pulled me in,” he said.

So with his eyes on reaching the US financial industry, he enrolled in Peking University to study applied mathematics about two years later.

“He was well known on campus not just for his age but his intellect,” said Fang Wu, a member of Zhao’s class who was four years older. They lived on different floors of the same dorm. Wu recalled that groups would spend weeks on problem sets, but Zhao would finish in days and spend the rest playing video games.

Years later, after Zhao earned his PhD in statistics at the University of California at Berkeley, and Wu got his PhD in physics at Stanford University, they would reunite at Citadel Securities. Zhao arrived there first, in 2006, following a summer internship at Lehman Brothers. He was 23, and Griffin’s market maker was only a fraction of its size now.

## Rewiring Desk

Zhao’s partnership with Griffin took off about a year later.

The US mortgage market was starting to seize up and Griffin went looking for someone able to model the potential fallout. A colleague pointed to Zhao, but it was almost the weekend. That evening, Zhao’s wife astutely suggested he set an alarm “just in case Ken calls.” So Zhao did, for 6 a.m. on a Saturday. The phone rang at 6:30.

The pair ended up spending hours in front of a white board. Soon, Griffin had a temporary seat in Zhao’s office, where he would look over the mathematician’s shoulder. Later, as the company made it through the 2008 crisis, business took off and so did Zhao’s career.

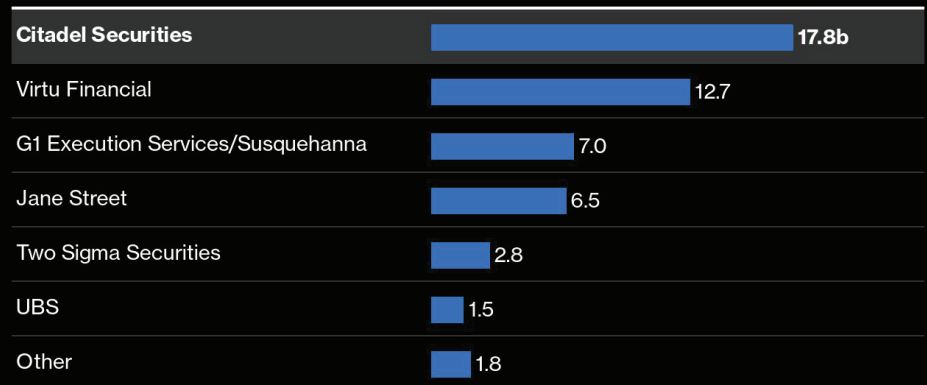
The first market-making desk Citadel Securities scaled up was options, which had launched in 2002. The initial approach was simple: The firm stepped in to take the other side of trades – or in industry parlance, offer liquidity – as more quant



Peng Zhao Photographer: Sarah Blesener/Bloomberg

## The Leader of the Market-Making Pack

Total retail shares processed in March



Source: Regulatory filings compiled by Bloomberg Intelligence  
Figures exclude trades of fewer than 100 shares.

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investors piled into the market with algorithmic trading.

While the unit was already considered a success, Zhao thought it could make multiples more. When its co-heads, David Smith and Jim Knight, departed in 2014, he was put in charge and redesigned the way it fielded orders, emulating how equities trading was evolving: relying more on predictive analytics than human intervention. That led to more assignments.

“You need credibility with senior leadership, and with Ken, that you can grow the business,” said Matt Culek, the firm’s chief operating officer, who joined in 2012. “Peng got things done.”

As Zhao built his teams, he made recruiting a priority, betting that the best minds had the strongest shot at making money. That often meant persuading people with other interests to join a Chicago-based firm focused on the guts of US markets. He started with his former Peking classmate, Wu.

Zhao started with a personal call to Wu, pitching a “great opportunity” in finance.

Flattered, Wu thanked him for his interest but said he didn’t know much about money, just physics.

Yet Zhao kept calling and started sending “brain teasers” that intrigued Wu, who broke down and agreed to an interview.

Wu figured it would be a day trip to Chicago. Soon he was a full-time employee commuting back and forth from the Bay Area. “He’s not a bad guy. He has good intentions,” Wu said. “He just gets his way.”

## Quiet Rise

It’s not only recruiting that Zhao treats like a puzzle to be solved. To entertain the table in restaurants, he asks the waiter to pick a bottle and pour some without showing the label, so he can taste it and identify the type, vintage and origin.

“I don’t like alcohol, I like the study of it,” he said. “There’s so much noise and randomness.”

The trick, which he honed while working on his doctorate near Napa Valley, is to take something that seems subjective or chaotic and break it into pieces that can be

mapped and understood. He sees markets the same way.

At Citadel Securities, he said, building new business lines always starts with figuring out how to instantly find the correct price for an asset – using math, modeling and machine-learning. Once that’s solved, the firm devises a method for buying and selling near that price that can be scaled up.

Those who know Zhao from his early days at the company say his transition from problem-solving to managing the business seemed natural. But he was slower to see himself as senior leadership material.

In mid-2016, with great fanfare, Griffin recruited former Microsoft Corp. COO Kevin Turner to run Citadel Securities. Zhao, who became chief scientist, said he wasn’t bothered by being passed over.

“If my career goal was to be CEO I would not have studied math in undergrad,” he said.

Turner didn’t strike up the same kind of rapport with Griffin that Zhao had, and as a new arrival was unaccustomed to the firm’s other idiosyncrasies. He lasted only several months. Zhao then stepped into the role with no further ado. By then, some colleagues saw his new title as simply describing what he was already handling.

“He was the driving force behind the innovation, in charge of the research agendas, and the revenue,” said Roy Kaiser, head of derivatives. “Everything that you would associate with a CEO.”

Ultimately, the decision meant that Griffin – as the owner – picked Zhao to be the person in charge of protecting and expanding much of his empire. The firm had about 300 people the year before Zhao took over. It has almost 1,600 now.

## Founder’s Capital

There’s a common misperception outside the financial industry that making markets is relatively safe and boring, akin



The building that houses Citadel Securities in Chicago *Photographer: Tim Boyle/Bloomberg*

to a power company keeping the lights on, according to Moody’s Investors Service analyst Fadi Abdel Massih. The reality is that it’s “a highly complicated process with the potential for huge losses.”

As CEO, Zhao is known to obsess over metrics. He helped build an internal management portal that tracks the performance of employees and business lines in real time, tallying revenue and showing how the firm is doing relative to peers. Managers review the results every month, deciding where to expand or retreat.

“There is a close-knit alignment of interest when it’s the founder’s capital being put at risk,” Massih said. As Zhao adds business lines, that diversifies the firm’s earnings so it can better stomach an occasional loss in any part of its business.

Citadel Securities is in the process of joining the Federal Reserve’s select roster of primary dealers, which trade directly with the New York Fed as it implements monetary policy and promise to bid in every US Treasury auction.

But its growing clout is drawing attention.

Critics including SEC Chair Gary Gensler have pointed to the firm’s dominance in equities markets as emblematic of a competitive problem in the industry. Last year, his staff put forth a 1,600-page proposal to rework US market structure and move more trading into the open on public exchanges. The SEC hasn’t given a timeframe for finalizing the overhaul.

Even if regulators push that through, Fitch Ratings analyst Bain Rumohr predicts Citadel Securities will be fine. “There is a lot at stake, but the big firms will be able to adapt,” focusing, for example, on the most profitable trades, he said.

Zhao acknowledges that regulatory and public scrutiny of the firm’s role in markets is intensifying, but he’s confident that the business can continue to evolve and keep an edge in the changing landscape.

“People recognize the fundamental role we play in the market,” he said. “And yet we’re subtle.”

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