

# The success story of the Medallion fund



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## Introduction

Jim Simons, nicknamed the “Warren Buffet of algorithms”, passed away last month at the age of 86. Below, we attempt to shed some light on the investment strategy of his Medallion fund, one of the most successful Hedge funds in history.

**Charles-Henry Monchau**

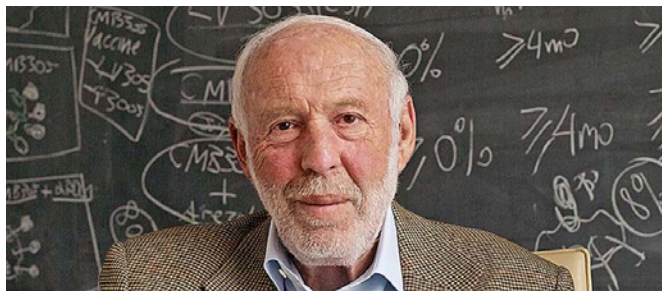
*Chief Investment Officer*

**Oliver Ramos**

*Junior Investment Analyst*

The Medallion Fund, managed by Renaissance Technologies, is widely recognised as one of the best-performing Hedge Funds in history. With annualised returns (after fees) approaching 40% since its inception, this fund has acquired legendary status in the financial world. This phenomenal success is mainly due to the algorithms developed by former mathematics professor Jim Simons, whose innovative approach to trading has transformed the financial sphere. Find out more below.

### About Jim Simons



Jim Simons was born on April 25, 1938, in Newton, Massachusetts. From an early age, Simons demonstrated an exceptional talent for mathematics, a passion that would shape his academic and professional life. He pursued his graduate studies at the Massachusetts Institute of Technology (MIT), where he earned a B.S. in mathematics. Simons went on to earn his doctorate at the University of California, Berkeley, in 1961, aged just 23. A few years later, in 1964, he worked as a cryptanalyst for the National Security Agency during the Vietnam War. Simons' academic career was marked by important contributions to the field of mathematics, particularly geometry and topology. He has taught at MIT and Harvard University. His research in differential geometry earned him widespread recognition and respect in the mathematical community.

Although already an accomplished academic, Simons' interest in applying mathematical principles to real-world problems led him to explore the financial markets. Thus, in 1978, in a Long Island shopping mall, he founded Renaissance Technologies (RenTec), initially named Monometrics before being renamed in 1982. Simons' transition from academia to hedge funds was not a smooth one. RenTec's early years were marked by strategic recruitment and experimentation, as Simons and his team strove to perfect their trading strategies. Skilled as he was, Simons needed a team to carry out this massive project, and his first key hire began with his former mathematician colleague, Leonard E. Baum. Simons asked him to spend a day at Monometrics to help create a currency trading system. Baum wasn't interested in trading but agreed to do an old friend a favour. The story soon changed, however, as in 1979, the former, hooked on trading, gave up his university career. Baum, a proponent of short-term forecasting in chaotic environments, was making so much money trading various currencies and using his intuition that trying to create a quantitative style of trading seemed a waste of time. His strategy was to make an investment and hold it until it appreciated, however long that took. This stubborn strategy enabled him to overcome market turbulence and accumulate over \$43 million in profits between 1979 and 1982. Simons described him as "having the buy-low part, but not always having the sell-high part". Holding on to investments in this manner eventually led to losses; when the value of Baum's

investments fell by 40%, a clause in his contract with Simons was triggered, forcing Simons to sell all Baum's investments and end their business partnership. Ultimately, Baum would leave the firm in 1984 amid steep losses. The setback was so significant that Simons halted his firm's trading and even considered giving up trading altogether.

However, Simons kept trying, amassing price data, developing algorithms capable of predicting the markets next move, and setting up trading models that could run on their own. Simons now also had the help of James Ax, a mathematics PHD, who was instrumental in getting the firm off the ground. In 1988, after having been trading in the futures markets for a few years, Ax and Simons established the Medallion Fund, which would later become RenTec's flagship fund. Despite the success the fund is renowned for today, the early days weren't that easy. In its first year the fund delivered a net return of 9% while the S&P500 was up over 16% and in its second year the fund lost a 4% while the S&P500 was up over 30%. The tensions that mounted within the company as a result, led to Ax being bought out of the firm in 1989.

Subsequently, Simons brought in Elwyn Berlekamp to help redesign the company's trading system from the ground up to return to profitability. Berlekamp was a prominent game theorist, having received a PHD in electrical engineering from MIT and made significant contributions to mathematics and coding theory. His strategies leveraged a deep understanding of the Kelly criterion, a method for determining the optimal size of a series of bets to maximize the expected value of the logarithm of wealth. In 1989 he was put in charge of the Medallion fund, leading to the fund's first great success, delivering a 59% net return that same year.

Two additional hires that were critical to the fund's success were Robert Mercer and Peter Brown. Mercer and Brown found their way into Renaissance Technologies after being lured away from IBM by Simons in 1993. The pair were involved in implementing a new trading system, that marked the beginning of a period of outstanding performance. Mercer, on probabilities and executing strategy: "We're right 50.75% of the time (...) but we're 100% right 50.75% of the time, you can make billions that way". Their contributions to the firm eventually led them to the roles of Co-CEO in 2010. Peter Brown has since taken over the role of sole CEO, after Mercer's resignation in 2017.

### The Medallion Fund

This hedge fund is undoubtedly the crown jewel of Renaissance Technologies. Known for its extraordinary performance, the fund posted an annualised return of 39.9% between 1988 and 2022 (note that this is a theoretical return, as the fund is capped at \$15 billion, and excess returns are returned to investors each year). However, perhaps the most intriguing feature of Medallion is that it is shrouded in secrecy, with the people who manage it guarding the strategies and methodologies used. The fund was initially financed to the tune of \$20 million by Renaissance Technologies' partners and has since grown to over \$10 billion in assets under management. This testifies to the robustness of its strategy, with the fund able to continue delivering extraordinary performance despite growing assets. The Medallion fund team currently comprises 90 PhDs in mathematics, physics, computer science and related fields, working tirelessly to refine and improve models.

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*It's important to surround yourself with smart and talented people. Collaboration and diverse perspectives lead to better outcomes.*

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Jim Simons

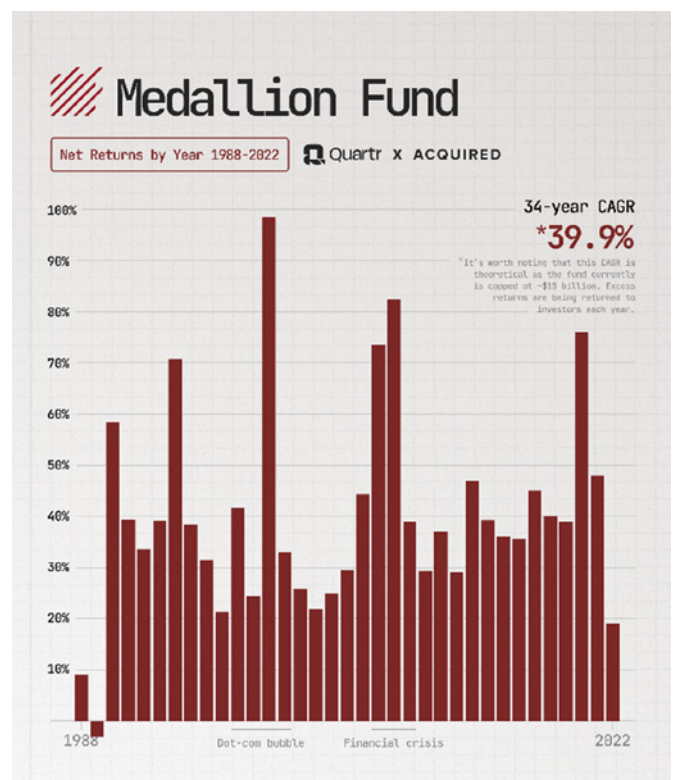
Although precise details are not disclosed, it is accepted that the Medallion Fund's strategy is based on the use of statistical arbitrage, high-frequency trading (HTF) and pattern recognition. The methodology on which the system is based does not seek to understand the “why” of market movements, but rather focuses on the “what”, trying to identify non-random patterns in the data. The fund's algorithms constantly analyse market data for discrepancies, enabling rapid execution of trades and taking advantage of short-term movements. This high-frequency trading approach exploits very brief, small-scale opportunities, often undetectable to traders using less sophisticated methodologies.

The fund's performance is also accompanied by a unique compensation structure. Renaissance Technologies charges some of the highest fees in the industry, charging a 5% annual management fee and a 44% performance fee. Despite these high fees, investors deemed eligible have been more than willing to invest due to the fund's exceptional track record. It's worth noting that the Medallion Fund has been closed to outside investors since 1993, with the firm buying out the last investor in the Medallion fund in 2005. Now the fund primarily benefits Renaissance's current and past employees and their families.

### Medallion's impact on the financial industry

The success of the Medallion Fund under Jim Simons' leadership has had a deep and lasting impact on the financial industry. The innovative use of mathematics and algorithmic trading used by Renaissance Technologies has not only set new standards for hedge fund performance but also reshaped the landscape of quantitative finance. Since its inception, many hedge funds and investment firms have followed in their footsteps, and set an emphasis on employing mathematicians, physicists, and data scientists to develop their own quantitative trading strategies. Current CEO Peter Brown said the company “almost exclusively” hires from a non-finance background, saying: “We find it much easier to teach mathematicians about the markets than it is to teach mathematics and programming to people who know about the markets”. This shift has led to the rise of the “quant hedge fund,” where decisions are driven by data and algorithms rather than traditional analysis and intuition.

Beyond all his professional accomplishments Jim Simons is also known for his philanthropic efforts, having donated over \$4 billion to such causes. The Simons Foundation established by Jim and his wife Marilyn funds initiatives in areas such as autism research, basic sciences, and early childhood education, establishing research programs such as the Simons Foundation Autism Research Initiative in 2003. Jim Simons legacy extends beyond his financial and philanthropic achievements. He has shown the world that scientific methods can be applied successfully to the financial markets, challenging the status quo in the field. His work has inspired a generation of quants and demonstrated the value of interdisciplinary thinking. His ability to bridge the gap between theoretical mathematics and real-world finance has not only earned him a spot on the Forbes 400 but also left a lasting legacy in both fields. “It's startling to see such a highly successful mathematician achieve success in another field” – Edward Witten (considered one of the most accomplished theoretical physicists alive).



Source: Quatr

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## For further information

### **Banque Syz SA**

Quai des Bergues 1  
CH-1201 Geneva  
Tel +41 58 799 10 00  
syzgroup.com

### **Charles-Henry Monchau**

Chief Investment Officer  
charles-henry.monchau@syzgroup.com

### **Oliver Ramos**

Junior Investment Analyst  
oliver.ramos@syzgroup.com

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