# Semiconductors OR Quantum Computing—or Semiconductors AND Quantum Computing?

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**Christopher Gannatti, CFA**
Global Head of Research

**Jonathan Flynn**
Director of Market Strategy

## Key Takeaways

- Quantum computing's recent momentum, highlighted by IonQ's World Quantum Day networking breakthrough, reinforces growing investor interest in specialized computing platforms that could reshape fields like drug discovery, optimization and cryptography.
- Despite excitement around quantum innovation, the sector still depends heavily on classical semiconductor infrastructure for qubit control, error correction and data processing, underscoring why the future of computing will likely be built on both architectures together.
- For investors seeking targeted exposure to the quantum theme, the WisdomTree Quantum Computing Fund (WQTM) emphasizes pure-play quantum innovators and offers differentiated access to companies positioned at the forefront of next-generation computing development.

## Step One: What Quantum Computing Actually Is (And Isn't)

Let's start with the concept, because confusion here can be real and consequential.

Classical computers, specifically the kind in your phone, laptop, and every data center on earth, process information as bits. Each bit is either a 0 or a 1. Everything from a spreadsheet to a streaming video ultimately reduces to long strings of binary decisions, meaning they can all be represented by a strong, sometimes quite a long string, of 1's and 0's.

Quantum computers work differently. They use quantum bits, or qubits, which exploit the principles of quantum mechanics to exist in multiple states simultaneously, a property called superposition. They can also become entangled with one another, meaning the state of one qubit is instantly correlated with another, no matter the distance. These properties allow quantum systems to process *certain types of calculations* in ways that would take classical computers an impossibly long time to complete.

The key phrase there is *certain types of calculations*, and this deserves repeating.

Quantum computers are not simply faster classical computers. They are fundamentally different tools, suited to a narrow but potentially transformative class of problems:

- Drug discovery
- Materials science
- Financial modeling
- Cryptography
- Optimization in logistics

For most computing tasks that we interact with daily, such as running a website, streaming a movie, or sending an email, quantum hardware offers no advantage whatsoever.

This distinction will matter enormously for investors. Quantum computing is not replacing the cloud. It is not replacing your laptop. It is being developed as a specialized capability that, when it matures, will be layered on top of the classical infrastructure we already have.

## Step Two: Why Semiconductors Aren't Going Anywhere

Here is the part of the quantum story that most coverage glosses over:

*Quantum computers cannot function without classical computing infrastructure, and at the heart of that infrastructure are semiconductors.*

Consider what it takes to run a quantum processor. Depending on the specific qubit modality, the qubits themselves may operate at temperatures near absolute zero, colder than deep space, requiring sophisticated cryogenic systems.1

- The signals that control and read those qubits are generated by classical electronics.
- The error correction needed to make quantum calculations reliable, one of the field's central challenges, is itself a massive classical computing problem.2
- The results a quantum system produces have to be interpreted and acted upon by conventional software running on conventional hardware.

In other words, the quantum future runs on a classical foundation. Semiconductors are not the old world being displaced by the new one. They are the substrate on which the new world is being built.

This is why the framing of semiconductors versus quantum computing can risk missing the point. The more accurate picture is semiconductors and quantum computing, with the classical layer providing the scaffolding that makes quantum systems possible, practical, and eventually scalable.

## Step Three: Mapping the ETF Landscape

With that conceptual grounding in place, the ETF conversation becomes more interesting, and more precise.

- The VanEck Semiconductor ETF (SMH) is designed to track the total return performance of, before fees and expenses, the MVIS® US Listed Semiconductor 25 Index. This is the largest ETF, by assets under management, with specific focus on semiconductors.3 Candidates must for inclusion in this index must derive at least 50% of revenues from semiconductor production or semiconductor equipment manufacturing and must be US-listed. From the top 50 names by market cap, securities are ranked on a combined score of free-float market cap and three-month average daily trading volume, and the highest-ranking 25 are selected. Weighting is modified float-adjusted market cap, with holdings split into two buckets: "Large-Weights" (the 5–10 largest pure-play names) are capped collectively at 50% with individual ceilings of 20% and floors of 5%; all remaining "Small-Weights" are capped individually at 4.5%. The index reconstitutes semi-annually and rebalances quarterly.4

On the quantum side:

- The Defiance Quantum ETF (QTUM) is built to track the total return performance of, before fees and expenses, the BlueStar® Machine Learning and Quantum Computing Index. QTUM was the largest U.S. listed thematic ETF within the Quantum Computing theme.5 This global index casts a wider net than its name implies, capturing companies involved in either quantum computing (superconducting materials, quantum algorithms, manufacturing equipment) or machine learning (GPUs, FPGAs, ASICs, semiconductor manufacturing equipment, and big data management).6 Eligible exchanges span roughly 30 countries. Selection targets 99% coverage of the eligible universe's free-float market cap, with a minimum of 70 components; all companies deriving at least 50% of revenues from quantum computing are included by rule regardless of size rank. Weighting is equal weight, subject to a liquidity-based cap calculated as each security's three-month average daily trading volume divided by $100 million, with excess redistributed equally among uncapped names. The index reconstitutes semi-annually.7
- The WisdomTree Quantum Computing Fund (WQTM) is built to track the total return performance of, before fees and expenses, the WisdomTree Classiq Quantum Computing Index. Co-developed with Classiq, a quantum software specialist, this index requires a minimum market cap of $200 million and average daily trading volume of $1 million over the prior three months, across specified developed and emerging market exchanges. Each company receives a Relevancy Score of 1–3 reflecting the centrality of quantum activity to its business, and is classified as either a Pure Player (quantum as primary focus) or a Diversified Innovator (quantum as part of a broader business). Constituents start at equal weight, then undergo a two-step adjustment that tilts toward higher relevancy and purity scores. Individual weights are capped at 15%, and the index rebalances quarterly.

Those descriptions are important, but we find it particularly impactful to immediately review the top 10 constituents of each strategy alongside them. This is the translation that effectively shows the major positions that these methodologies lead to when applied to their appropriate eligible universes. In Figure 1:

- **SMH is a conviction semiconductor portfolio.** The top 10 holdings accounted for 72% of the fund, with Nvidia alone approaching 20%.
- **WQTM puts quantum front and center.** The top four holdings were highly focused quantum companies, Rigetti, IonQ, D-Wave, and Quantum Computing Inc., reflecting the index's methodology in action. The weighting tilts toward mission-driven quantum exposure, not adjacency.
- **QTUM's equal-weight design produces a strikingly different portfolio.** No single holding exceeds 1.88%, and the top 10 collectively represent only 17% of the fund. The breadth is real, but investors must decide if this breadth approaches thematic dilution, with names like Nokia, Lockheed Martin, and Orange sitting alongside semiconductor specialists.

## Figure 1: Translating Methodology into Top 10 Constituent Exposure

| WQTM | |
|---|---|
| **Company Name** | **Weight** |
| Rigetti Computing | 5.79% |
| IonQ | 5.70% |
| D-Wave Quantum | 4.74% |
| Quantum Computing | 3.69% |
| Amazon.com | 3.51% |
| Intel | 3.17% |
| IBM | 3.13% |
| Nvidia | 3.11% |
| Alphabet | 3.10% |
| Microsoft | 3.09% |
| **Total Top 10 Weight** | **39.03%** |

| QTUM | |
|---|---|
| **Company Name** | **Weight** |
| Teradyne | 1.88% |
| Tower Semiconductor | 1.80% |
| MKS Instruments | 1.77% |
| STMicroelectronics | 1.70% |
| Nokia | 1.67% |
| Lockheed Martin | 1.67% |
| Micron | 1.66% |
| Orange | 1.66% |
| Coherent | 1.65% |
| Lam Research | 1.64% |
| **Total Top 10 Weight** | **17.10%** |

| SMH | |
|---|---|
| **Company Name** | **Weight** |
| Nvidia | 19.68% |
| TSMC | 11.73% |
| Broadcom | 7.82% |
| ASML | 5.01% |
| AMD | 4.77% |
| Analog Devices | 4.74% |
| KLA | 4.71% |
| Texas Instruments | 4.68% |
| Applied Materials | 4.59% |
| Lam Research | 4.56% |
| **Total Top 10 Weight** | **72.29%** |

Sources: WisdomTree, Morningstar, FactSet, with data as of 3/31/2026 and source from WisdomTree's Fund Comparison Tool within the PATH Suite of Tools. **Subject to change.**

## The Performance Picture So Far

WQTM only began its history October 9, 2025, an admittedly short track record. Figure 2a therefore only looks at a few relatively shorter periods even if Figure 2b does present the standardize performance picture as of March 31, 2026.

- World Quantum Day was an important signal,8 in that IonQ made an important announcement on quantum networking.9 The pure play quantum companies responded to this announcement with strong share price appreciation.10 This is a short-term situation and we'd note, the journey to true networked quantum systems at scale has not yet been completed. However, since the market responded, we find it important to monitor how WQTM and QTUM, two funds notably focused on quantum computing in different ways, responded to this known positive announcement.
- Extending the picture over the past month, 3-Month and Year-to-Date 2026 periods, we see the strong performance of SMH most clearly. SMH is clearly providing a responsiveness to something separate and distinct versus the two quantum computing-focused strategies.

## Figure 2a: Performance Post World Quantum Day and Other Recent Periods

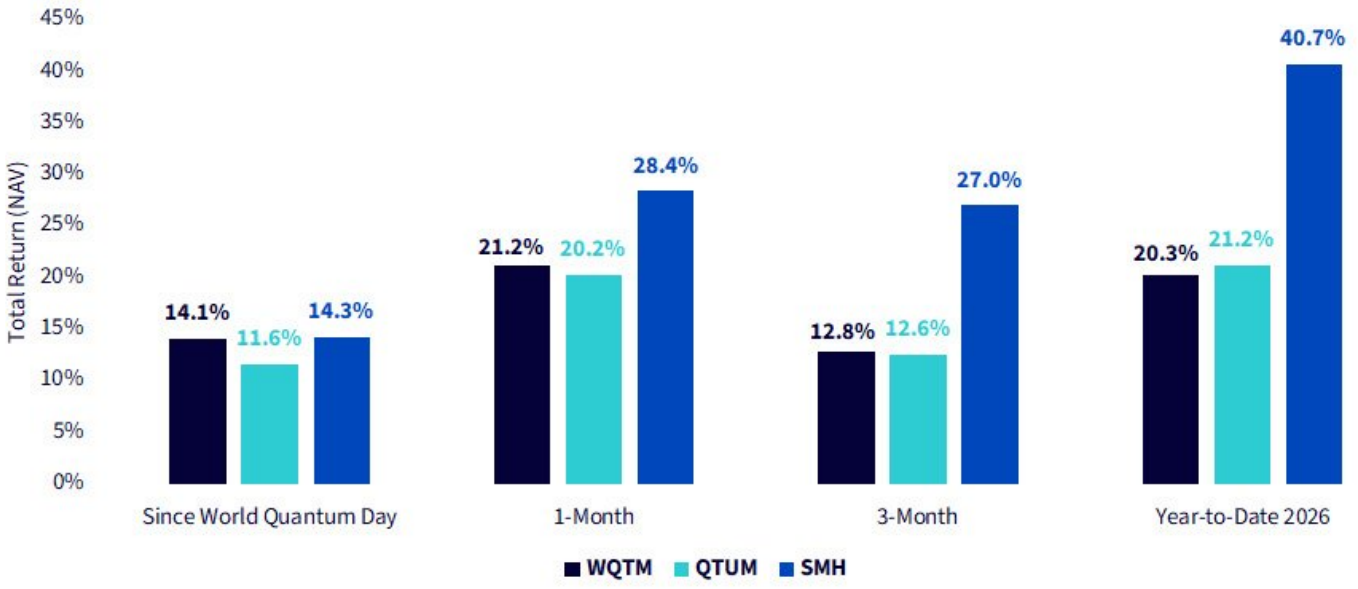


**Figure 2b: Standardized Performance**

| Fund Name | Fund Ticker Symbol | Fund Inception Date | Fund Expense Ratio | Fund SEC 30-Day Yield | Year-to-Date | 1-Year | 3-Year | 5-Year | 10-Year | Since Fund Inception |
|---|---|---|---|---|---|---|---|---|---|---|
| WisdomTree Quantum Computing Fund (NAV) | WQTM | 10/9/25 | 0.45% | 0.18% | -5.38% | N/A | N/A | N/A | N/A | -17.86% |
| WisdomTree Quantum Computing Fund (MP) | WQTM | 10/9/25 | 0.45% | 0.18% | -4.68% | N/A | N/A | N/A | N/A | -17.22% |
| Defiance Quantum ETF (NAV) | QTUM | 9/4/18 | 0.40% | 0.97% | -2.98% | 44.24% | 32.98% | 18.91% | N/A | 22.06% |
| Defiance Quantum ETF (MP) | QTUM | 9/4/18 | 0.40% | 0.97% | -2.85% | 44.29% | 32.97% | 18.89% | N/A | 22.18% |
| VanEck Semiconductor ETF (NAV) | SMH | 12/20/11 | 0.35% | 0.22% | 5.08% | 79.64% | 42.81% | 26.23% | 31.18% | 26.92% |
| VanEck Semiconductor ETF (MP) | SMH | 12/20/11 | 0.35% | 0.22% | 5.28% | 79.84% | 42.93% | 26.26% | 31.20% | 26.90% |

Sources: WisdomTree, FactSet and Morningstar, with data accessed on April 27, 2026 from the Fund Compare Tool within the broader set of PATH tools. Since World Quantum Day references since the close of April 13, 2026 to April 24, 2026. Each other period references that period, as of April 24, 2026. NAV denotes total return performance at net asset value. MP denotes market price performance. **Past performance is not indicative of future results. Investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data quoted. For the most recent month-end and standardized performance, click the relevant ticker: WQTM, QTUM, SMH.**

## Conclusion: Building a Portfolio for the Future of Computing

For investors thinking seriously about combining quantum computing exposure with a core semiconductor holding, the pairing question deserves more than a cursory glance at ticker names. On three dimensions that matter, purity of quantum exposure, degree of overlap with SMH, and historical correlation of returns, WQTM presents a more compelling complement to SMH than QTUM does. Its top holdings are dominated by pure-play quantum companies, its construction methodology tilts deliberately toward quantum centrality rather than adjacency, and its return history has tracked SMH less closely than QTUM's broader, more semiconductor-infused portfolio.11

None of that is a guarantee of anything going forward. Correlation regimes shift, pure-play companies carry their own concentration risks, and the quantum timeline remains genuinely uncertain.

But for an investor who believes the future of computing is being built at the intersection of classical and quantum architecture and wants a portfolio that reflects both sides of that thesis, a thoughtful blend of SMH and WQTM may be worth the consideration.

## Figure 3: Additional Information

| Fundamentals | WisdomTree Quantum Computing Fund (WQTM) | Defiance Quantum ETF (QTUM) | VanEck Semiconductor ETF (SMH) |
|---|---|---|---|
| Inception Date | 10/9/25 | 9/4/18 | 12/20/11 |
| Objective | The WisdomTree Quantum Computing Fund is designed to track the total return performance of, before fees and expenses, the WisdomTree Classiq Quantum Computing Index. The index is co-developed with Classiq, a leader in quantum software, to ensure relevant and expert-driven coverage of the ecosystem. Each company is assigned a relevancy score based on the importance of its quantum activities, as well as a pure-play or diversified distinction. The index is designed to push more weight to pure play companies with higher relevancy and to pull weight away from diversified companies with lower relevancy. The Index is rebalanced quarterly. | The Defiance Quantum ETF is designed to track the total return performance of, before fees and expenses, the BlueStar® Machine Learning and Quantum Computing Index (BQTUM), which tracks liquid companies in the global quantum computing and machine learning industries, including products and services related to quantum computing or machine learning, such as the development or use of quantum computers or computing chips, superconducting materials, applications built on quantum computers, embedded artificial intelligence chips, or software specializing in the perception, collection, visualization, or management of big data. | VanEck Semiconductor ETF (SMH®) seeks to replicate as closely as possible, before fees and expenses, the price and yield performance of the MVIS® US Listed Semiconductor 25 Index (MVSMHTR), which is intended to track the overall performance of companies involved in semiconductor production and equipment. |
| SEC 30-Day Yield | 0.18% | 0.97% | 0.22% |
| Total Expense Ratio | 0.45% | 0.40% | 0.35% |
| Underlying Index Name | WisdomTree Classiq Quantum Computing Index | BlueStar® Machine Learning and Quantum Computing Index | MVIS® US Listed Semiconductor 25 Index |
| Total Assets Under Management (millions) | $26.92 | $3,531.05 | $46,363.40 |

Sources: WisdomTree, Morningstar, FactSet and specific fund sponsor websites. AUM data is as of 3/31/2026. **Subject to change.**

1. Source: Aamir, M. A., Jamet Suria, P., Marín Guzmán, J. A., et al. (2025). Thermally driven quantum refrigerator autonomously resets a superconducting qubit. *Nature Physics*.
2. Source: Maurya, S., et al. (2024). *Managing classical processing requirements for quantum error correction*. arXiv.
3. As of March 31, 2026, SMH had assets under management of greater than $46.3 billion. WisdomTree maintains a thematic classification of all U.S. listed thematic ETFs. Semiconductors are a theme and SMH is the largest strategy within that theme. The sources of the AUM are Morningstar and Factset.
4. Source: MarketVector Indexes GmbH. (2026, February). *MVIS® US Listed Semiconductor 25 Index: Index guide* (Version 1.03).
5. As of March 31, 2026, SMH had assets under management of greater than $3.5 billion. WisdomTree maintains a thematic classification of all U.S. listed thematic ETFs. Quantum Computing is a theme and QTUM is the largest strategy within that theme. The sources for the AUM are Morningstar and Factset.
6. GPU stands for Graphics Processing Unit, FPGA stands for Field Programmable Gate Array, and ASIC stands for Application Specific Integrated Circuit. These are 3 distinct specific types of semiconductors.

7. Source: MarketVector Indexes GmbH. (2025, January). *BlueStar® Machine Learning and Quantum Computing Index: Index guide* (Version 1.02).
8. Source: World Quantum Day. (2022). *Why April 14*. World Quantum Day is scheduled for April 14th each year, with 2026's date being 4/14/2026.
9. Source: IonQ. (2026, April 14). *IonQ achieves key photonic interconnect milestone, demonstrating networked quantum systems using entanglement*.
10. Source: Warrick, J. (2026, April 15). Quantum computing stocks: Why are D-Wave, IonQ rising again? Fast Company.
11. Data references as of March 31, 2026, sourced from WisdomTree, Morningstar and Factset through the Fund Compare Tool within WisdomTree's broader set of PATH tools. Holdings and correlation of returns are subject to change.

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*Source: World Quantum Day. (2022). Why April 14. World Quantum Day is scheduled for April 14th each year, with 2026's date being 4/14/2026.*

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## Important Risks Related to this Article

All funds are managed differently and do not react the same to economic or market events. The investment objectives, strategies, policies or restrictions of other funds may differ and more information can be found in their respective prospectuses. Therefore, we generally do not believe it is possible to make direct fund to fund comparisons in an effort to highlight the benefits of a fund versus another similarly managed fund.

**WQTM:** There are risks associated with investing, including potential loss of principal. To the extent the Fund invests a significant portion of its assets in the securities of companies of a single country or region, it is more likely to be impacted by events or conditions affecting that country or region. The economic, political, regulatory, and other events and conditions that affect issuers and investments in the United States differ significantly from those associated with other countries and regions. U.S. financial markets have become increasingly globalized becoming more integrated with financial markets around the world and as a result, U.S. financial markets are increasingly vulnerable to the risks that may affect non-U.S. financial markets. The Fund's investments in the U.S. are subject to the risk that they, and the U.S. economy more generally, will be adversely affected by a decrease in imports or exports, changes in trade regulations, inflation, and/or an economic recession in the U.S. The Fund invests primarily in the securities of quantum computing companies. Companies engaged in the development of quantum computing or machine learning technology may be significantly impacted by rapid technological advancements, product obsolescence, intense competition, consumer demand, and government regulation. Such companies are also heavily dependent upon patent and intellectual property rights. The Fund invests in the securities included in, or representative of, its Index regardless of their investment merit and the Fund does not attempt to outperform its Index. The composition of the Index is governed by an Index Committee and the Index may not perform as intended. Please read the Fund's prospectus for specific details regarding the Fund's risk profile.

For additional fund disclosures, click the respective ticker: QTUM, SMH.