

Autonomous Driving Fuels Our CES 2019 Public and Private Company Takeaways

Intel, STMicro, Qorvo, and Qualcomm remain attractively priced.

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Contents

- 5 Our Observations and Sense of CES 2019
- 6 Self-Driving and ADAS at Intel's Mobileye
- 8 Nvidia Returns to Gaming Roots
- 10 STMicro Shows Product Breadth
- 12 ADI's Strong Automotive Growth
- 15 The Autonomous Future of Lyft
- 16 Bell and the Nexus Air Taxi
- 17 Simulating Autonomy and the Commodification of LiDAR
- 18 Cognanta—Simulated Learning for Autonomous Vehicles
- 20 Seoul Robotics—A Software-Based Approach to LiDAR
- 21 Qualcomm Focused on Automotive and Enabling 5G
- 22 Qorvo Promotes 6th Generation WiFi
- 24 Synaptics Focused on Consumer Internet of Things
- 26 Startups Focused on Internet of Things
- 27 uBeam: The Hoverboard of Power Transmission
- 29 Intellithings Releases RoomMe
- 30 Big Market Potential for HealthTech
- 31 Wearable Health Plc's Smart Device
- 33 Bongmi: Fertility Tracking for the Masses

This is an abbreviated version of the Morningstar/PitchBook report "Autonomous Driving Fuels Our CES 2019 Public and Private Company Takeaways". For a full copy, please contact equitysupport@morningstar.com or sales@pitchbook.com.

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AV, Artificial Intelligence, Robotics, Internet of Things, HealthTech and 5G Were All on Display

We attended CES (formerly known as the Consumer Electronics Show), the premier technology showcase, in Las Vegas in January 2019, looking at both public and private companies. In our view, CES continues to evolve and diversify, as the focus is still drifting away from smartphones, tablets, and PCs and toward industrial, automotive, Internet of Things, and health applications. Across our public and private research coverage, we remain most impressed with the push toward active safety systems in automobiles, autonomous driving (including our self-driving car ride with Lyft), and transportation technology. We've long believed that the push toward safer, greener, smarter cars would be led by rising electronics content per vehicle, in turn boosting revenue growth for many technology firms under our coverage. We see no signs of these content gains slowing down in vehicles, as more and more sensors, processors, connectivity, and software enhancements are enabling the latest vehicle technologies.

Across our public equity research coverage, we remain impressed with Intel's push into transportation via its acquisition of Mobileye. We also remain bullish on STMicro as we view the firm as far more than an Apple iPhone supplier and like its diversified product portfolio and ongoing push into automotive. Qorvo also appears deeply undervalued as long-term iPhone demand concerns are overdone, in our view. Our meetings with Nvidia, Analog Devices, Synaptics, Qorvo also provided us with new insights.

Finally, in addition to our autonomous driving ride with Lyft, we met with several interesting private companies, such as [uBeam](#) and [Intellithings](#) in the Internet of Things space, [Wearable Health PLC](#) and [Bongmi](#) with impressive HealthTech products, and [Bell](#), the helicopter company whose demo was a highlight of the show as it is partnering with Uber on the Nexus air taxi. Additionally, our meetings with [Cognata](#) and [Seoul Robotics](#) gave us insight into the evolving investments into automotive-grade LiDAR solutions.

Public Companies Mentioned

Name/Ticker	Economic Moat	Moat Trend	Currency	Fair Value Estimate	Current Price	Uncertainty Rating	Morningstar Rating	Market Cap(Bil)
Intel INTC	Wide	Negative	USD	65.00	48.71	Medium	★★★★	220.67
Nvidia NVDA	Narrow	Positive	USD	120.00	151.04	Very High	★★★	91.77
STMicroelectronics STM	None	Stable	USD	22.00	14.05	High	★★★★	12.50
Qualcomm QCOM	Narrow	Negative	USD	72.00	55.98	High	★★★★	69.46
Analog Devices ADI	Wide	Stable	USD	96.00	87.57	Medium	★★★	32.39
Qorvo QRVO	None	Stable	USD	86.00	61.30	High	★★★★	7.64
Synaptics SYNA	None	Stable	USD	64.00	39.36	Very High	★★★★	1.35

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Key Takeaways

- ▶ CES 2019 continues to showcase Technology's diversification away from the consumer device (smartphone, tablet, PC) and toward a wider array of applications across diverse end markets (transportation, industrial, Internet of Things, health, and medical).
- ▶ We remain bullish on the tech sector's prospects within the automotive sector in particular. We also noted a rising focus on artificial intelligence within Internet of Things and robotics, a host of emerging HealthTech products, and emphasis on 5G, the next wave of wireless networks.
- ▶ Among bellweather public technology firms, we noted that Google and Amazon both had a stronger presence at CES, as both emphasize their voice recognition assistants across a host of partners and applications.
- ▶ We attended Mobileye's presentation at CES 2019 and came away with renewed confidence in our positive thesis on Best Idea Intel. In 2018, Mobileye recorded 28 new design wins, while seven vehicle models launched with EyeQ 4 processors for advanced functionalities beyond basic ADAS. For the year, it shipped 12.4 million EyeQ chips versus 2.7 million in 2014, which represents a 46% compound annual growth rate. We remain enthused on Intel's future prospects in automotive as its Mobileye acquisition bears fruit with increased functionality added to existing ADAS offerings, and we see an attractive margin of safety for this wide-moat chip titan.
- ▶ We met with Colette Kress, Nvidia's CFO, and discussed the firm's recent gaming product launch (RTX 2060) and data center prospects in the wake of competition from customers (Google) and peers (Intel and Xilinx). Management remains uber-bullish on the firm's forward prospects while discounting its challengers (be it AMD in gaming GPUs, Intel in AI and self-driving, and Google with its TPU for inferencing). We see shares as modestly overvalued today and continue to believe competitive threats in Nvidia's nascent opportunities (AI and self-driving) remain unappreciated.
- ▶ STMicro remains deeply undervalued, in our view, as recent concerns about sluggish Apple iPhone demand, and its effects on ST, are overdone. We remain impressed with ST's product diversification beyond the smartphone and continue to foresee nice growth opportunities for STMicro in 32 bit microcontrollers and imaging products like Time of Flight sensors aimed at industrial and Internet of Things applications.
- ▶ Analog Devices' automotive chip growth has lagged several of its peers in recent years due to legacy product headwinds, but as such headwinds are starting to subside, we remain optimistic about the firm's ability to kickstart high-single-digit revenue growth from cars. At CES, ADI showcased its 28 nm CMOS radar solutions, its A2B audio, fingerprint sensor, and steer-by-wire technologies.
- ▶ We hailed a self-driving car, operated by Lyft in partnership with Aptiv inside of a BMW 540. While we saw some hiccups, and the car failed to make some moves that otherwise would have been performed by a human driver, the experience was an interesting preview of what we believe is the future of

ridesharing. We also spent time with Bell, whose demo was a highlight of the show, in our view, as it showcased its Nexus air taxi in partnership with Uber.

- ▶ We continued to see strong interest in LiDAR for automotive sensing at CES. Our meetings with private companies Cognata and Seoul Robotics highlighted a bit of a shift in LiDAR investment, with a focus on software and simulation and a fear that LiDAR hardware may become commoditized over time. From a public company perspective, as with many technologies, we prefer to invest in the "arms dealers" in software and semiconductors that enable the hardware.
- ▶ Qualcomm remains undervalued, but its ongoing saga with Apple refrains us from recommending shares over Best Idea Intel. We met with company representatives that stressed the firm will be doubling down on automotive and 5G, in lieu of PC and server processors, which we believe is pragmatic. However, the firm's licensing business that supports our narrow-moat rating continues to face significant pressure, while its chip business faces a stagnating addressable market in mobile that we are unsure can be supplanted by automotive and 5G.
- ▶ We met with Cees Links, Qorvo's general manager of its Wireless Connectivity Business unit and discussed the 6th generation of WiFi, 802.11ax, coming soon to the home. We think the rise of .11ax bodes well for Qorvo's connectivity business. More broadly, we continue to view Qorvo's shares as materially undervalued, as near-term Apple iPhone demand concerns appear overdone to us, while we like Qorvo's growth prospects in 5G in smartphones, wireless infrastructure and other Internet of Things, and industrial devices.
- ▶ We attended Synaptics' management presentation and had a chance to speak with multiple executives about the firm's product pipeline that spans consumer Internet of Things, PC, automotive, and its core mobile. Overall, the convergence of audio, video, and display with ubiquitous smart voice bodes very well for the firm's broad portfolio of offerings. While mobile challenges may persist in the near term (across display driver, touch controllers, and fingerprint sensors), we foresee solid growth via consumer Internet of Things in the near term, as the firm is on track to double auto revenue by 2021 via its touch and display driver integrated solutions. Shares remain undervalued at current levels relative to our fair value estimate of \$64.
- ▶ uBeam is a venture-backed company developing over-the-air wireless charging systems for electronic devices, pivoting toward consumer Internet of Things and away from smartphones. Part of uBeam's notoriety comes from its promise of over-the-air power transmission via ultrasound, which has raised skepticism from the scientific community as uBeam's competitors in this segment utilize radio waves or magnetic resonance. We believe expectations for uBeam are high and note the company has raised ample capital, including \$55 million from notable investors such as Andreessen Horowitz, Upfront Ventures, Mark Cuban, Marissa Meyer, and Tony Hsieh among others.
- ▶ Intellithings is a developer of personalized automation products for the burgeoning home automation market, which is expected to reach \$80 billion by 2022. At CES, Intellithings showcased its first

consumer product, RoomMe, to be released in the first quarter of 2019. RoomMe uses a combination of sensors and a mobile application to create an indoor room-level positioning system, which allows for person-specific home automation. As the market for smart devices grows and commoditizes, we believe personalization capabilities like RoomMe could be a key differentiator.

- ▶ Wearable Health Plc is banking on developing a premium wearable heart monitor for a more professional market. Its wearable electrocardiogram (ECG) platform consists of a compact measurement device called the HeartBit, training tops (form-fitting shirts and sports bras) with integrated sensors, and an app to display data and provide social and personal training components.

- ▶ Bongmi produces fertility-tracking devices for women as well as healthcare devices for babies and young children. Their first fertility tracker, the Femometer, is essentially a Bluetooth-enabled basal thermometer accompanied by a fertility-tracking app. The company's second device, the Ivy Smart Ovulation Tracker, consists of an at-home urine test to detect hormone levels for fertility tracking and detection of fertility-related health issues. We believe there is a large and growing market for fertility planning and infant care devices. According to Markets and Markets, the global fertility test market is expected to reach \$583 million by 2023, and the global infertility treatment market is expected to reach \$2.2 billion in the same time frame.