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OCEAN INSIGHT

Most makers of research tools for physical scientists report stable business. Some of their products are being used in the fight against the novel coronavirus.

Sitting in his UK Office, Henry Langston began receiving reports as the COVID-19 pandemic progressed from one part of the globe to another. Langston, chief commercial officer of Ocean Insight, says it began with employees being unable to return to the company's Shanghai offices from their New Year's travels. "Then we were sending masks to our workforce in China, and three weeks later, they were shipping masks to Europe and the US," he says. "We've seen different geographies and countries go through all sorts of different levels of lockdowns."

A 250-person company that makes UV, visible, and IR spectrometers, Ocean Insight serves mostly the biomedical diagnostics market. One of its largest customers makes blood analyzers that are used in intensive care units. "A big aha moment for us was understanding that anybody on a ventilator must have their blood checked every one to two hours when they are anesthetized," says Langston. "That made us realize how directly we were on the front lines and how important it was for us to be resilient as a business."

The company has received inquiries about utilizing spectroscopy to analyze UV light used in disinfecting personal protective equipment, Langston says. It's also looking at novel diagnostic approaches such as colorimetric assays and at fluorescent tagging for antibody identification.

PHYSICS TODAY reached out to a dozen suppliers of research tools used by physical scientists. Most reported weathering the pandemic with, at worst, only a slight downturn in sales. For many, the diversity of their product lines, the multiple markets they serve, and the high-tech



**SINCE THE OUTBREAK OF COVID-19**, Ocean Insight has seen increased interest in its spectral systems for the analysis of biological samples and UV disinfection sources. Here the company's spectrometers and accessories are used to measure fluorescence of proteins.

nature of their customers have insulated them from the worst effects of the virus. "We are a lucky crowd because the business we are in is inside the physics community," says Jan Benhelm, chief marketing officer of Zurich Instruments. "We are physicists and engineers dealing with other physicists and engineers, and we are all highly educated and motivated and passionate people. It's a very good environment."

"We're lucky with photonics and the world that we're in," echoes Langston. "With a lot of different end-user markets and applications, technology is even more important in times like this."

Applied Physics Technologies, which makes components for electron microscopes, was the only surveyed company to report that its operations were seriously affected by the pandemic. Al-

though it remained open as an essential business, the Oregon company had to lay off or furlough two-fifths of its 50-member workforce, says CEO Marcus Straw. Revenues are down 20% so far this year compared to 2019, when sales totaled \$6.1 million for the year. But Straw says the coronavirus is only partly responsible for the downturn; half is due to a slowing in the semiconductor industry that was underway prior to the pandemic. The deep pockets of Hitachi, which acquired the company last year, have helped to cushion the effects, Straw says. "We're not going to pull back on our growth plans. We think we will start seeing a slow ramping up in our business around September."

RBD Instruments, a 10-employee enterprise based in Oregon with four product lines—compact Auger electron

analyzers, sputter ion guns, picoammeters, and water-vapor desorption systems—has seen declines in one offset by increases in others. “They’re kind of averaging out. We’re making a sale here and a sale there on everything,” says co-owner Randy Dellwo. The company applied for and received a Paycheck Protection Program (PPP) loan from the Small Business Administration. Its products are used mainly by the semiconductor industry and in metal and surface R&D.

Zurich Instruments, a manufacturer of lock-in analyzers, impedance analyzers, and commercial quantum computing control systems, just hired a physicist for its Boston office and is looking to hire more, says Benhelm. About one-quarter of the company’s 90 employees worldwide hold PhDs in physics, and most of those work in sales and marketing. The overall business situation is stable, the supply chain hasn’t been disrupted, and almost all its customers—universities, national labs, and multinational companies—continue to place orders and take deliveries, he says.

Euclid Techlabs’ 20 employees include 18 with PhDs in physics or engineering, says Ilya Ponomarev, chief business development officer. The Maryland company collaborates with SLAC, Brookhaven, and other US national laboratories in developing accelerator components for industrial and medical applications. It’s applied for a grant from the Defense Department to develop a process for using accelerators to rapidly disinfect personal protection equipment. Negotiations with several customers, including two in China, have had to be put on hold, as has work on several Small Business Innovation Research awards that required experimental work at national labs. The company has secured a loan through the PPP, Ponomarev says.

Park Systems, headquartered in Suwon, South Korea, has seen sales of its atomic force microscopes (AFMs) continue to grow despite the pandemic, albeit at a slower pace than the 25–30% compounded growth it has seen in recent years, says Keibock Lee, president of Park America. The company’s first quarter, ending 31 March, was its best ever. Park has about 300 employees and annual sales of \$70 million. AFMs are used in R&D at academic and national labs and for quality assurance in indus-



**ATOMIC FORCE MICROSCOPES** such as this NX12 model from Park Systems have been used for research on previous coronaviruses, including the virus that caused the severe acute respiratory syndrome pandemic in 2002.

try. Founder and namesake Sang-il Park is a PhD physicist, and, says Lee, the company’s North American sales managers all have PhDs in physics, materials science, or chemistry.

Lee adds that it’s very likely the company’s instruments are being used in research to counter severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), because AFMs were vital in probing earlier coronaviruses.

Lumina Power, a 50-employee Massachusetts company, builds power supplies that drive laser diodes and charge capacitors. The firm has seen a 10-fold increase in demand for one of its products, a power supply that drives the UV flashlamps of a hospital room sterilizer made by Xenex. Lumina president Tung Huynh says the company is on track to record \$3 million–\$4 million from that one product, which would represent 20–25% of its typical annual revenues. That’s helped to cushion a big coronavirus-induced falloff in demand from its primary customers, manufacturers of dermatological laser instruments.

Teledyne Hastings makes vacuum gauges, thermal mass flow meters, and

mass flow controllers. Early on, the Virginia company was designated by its customers as an essential business, based on its products’ end uses in liquid-oxygen cryogenics, flow meters for personal protective equipment, and leak testing. Its flow controllers also are used in research, says director of sales and business development Douglas Baker. Business has held up well in the downturn largely because of large pre-pandemic orders placed by semiconductor manufacturers, he says. He isn’t sure whether that demand will last, however. “I’m proud to say we’re doing everything we can to help out” in the coronavirus effort, Baker says.

Wavelength Electronics, which counts physicists, chemists, and engineers among its 40 employees, makes electronic controllers for diode and quantum cascade lasers and controllers for thermoelectric and resistive heaters. Its markets range from agriculture to medicine to railroads. A slight decline in overall sales has been accompanied by an increase in orders for a component of immunoassay machines that are often used in vaccine research, says Lisa Mueller, a Wavelength marketing coordinator.

Based in Bozeman, Montana, Wave-length never closed its doors. “We were getting letters before the stay-in-place order that were saying ‘we are essential companies and you are essential suppliers so we need you to stay operating,’” Mueller says.

## Breathing easier

Sales at OnScale haven’t been seriously affected by the coronavirus, says Ian Campbell, CEO of the 35-employee startup. The Silicon Valley company builds engineering simulation platforms based on massively scalable multiphysics solvers—mathematical models that embody physics to tackle problems in engineering. The simulations can run either on local workstations or in the cloud to design items such as sensors, biomedical devices, and 5G components, he says. Since the COVID-19 outbreak, engineers at Intel, Google, Siemens, Philips, and other customers have been running solvers in the cloud from laptops at home, instead of on powerful on-site workstations.

In a collaboration known as Project BreathEasy, OnScale has teamed with Lexma to produce “digital twins” of actual COVID patients’ lungs, using computational fluid dynamics and structural analysis of the patients’ CT scans and x rays. The goal of the project, now in its test phase, is to maximize ventilator resources by helping doctors decide how patients should be ventilated, the proper ventilator settings, and duration of intubation. OnScale’s other coronavirus-related development projects include a partnership with the Institute for Transformative Technologies on a nonventilator breathing support apparatus and microfluidics lab-on-a-chip applications for medical testing and treatment with a separate partner.

Google Gradient Ventures and Intel Capital have been strong backers, but Campbell says that despite being a “COVID-proof” business, OnScale is finding it tough during the pandemic to attract additional venture capital to support its operations.

Toptica Photonics is a Germany-based developer and manufacturer of laser systems for scientific and industrial applications. Products include diode lasers, ultrafast fiber lasers, terahertz systems, and frequency combs. More than one-quarter of its 350 employees have PhDs, the majority in physics.

Mark Tolbert, president of Toptica’s US subsidiary, says sales are still growing. “Where I predict the biggest impact for our domestic business is at academic labs,” he says. “Universities are having such a hard time even reconsidering reopening.” Yet many are placing orders for equipment needed to perform their funded research.

## Evolving sales practices

Adapting to a virtual environment has been challenging for Toptica and others. “I have the philosophy that people need people, so I’m expecting a significant downward trend in sales from the loss of in-person interactions at conferences and sales calls,” Tolbert says. Before the pandemic, “we would have hundreds of new opportunities coming in from a conference like CLEO that aren’t there.”

In lieu of face-to-face interactions, Toptica has turned to virtual meetings. The company has experienced a “shockingly high” acceptance rate for its meeting invitations, says Tolbert. Direct virtual interactions, webinars, and remote demos have been successful, but virtual exhibitions have not had similar results. “We go through the dialog, and obviously we can’t move forward because nothing’s open. But we can get the process started,” he says. “We’re going to learn one of two things from the pandemic: Either we’ll be hugely impacted because we’re not getting new business, or that we were overspending on our marketing accounts,” he adds.

Before this year, Zurich Instruments typically sent representatives to 80 conferences, trade shows, and user meetings annually. After the American Physical Society’s March meeting was canceled on short notice, says Benhelm, “we basically flipped a switch from one day to the next” and rolled out webinars and virtual user meetings. One webinar on transport measurements in nanostructures attracted 300 attendees, “certainly a large crowd by any of our measures,” he notes. “This has been a great success and a blast for the team.”

Some coronavirus-forced changes to sales and marketing may endure when the pandemic ultimately ends. Campbell, for instance, says it’s very likely that some people will continue to work from home indefinitely, a development that would benefit OnScale.

David Kramer ■



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