



Ocean Optics
bringing answers to light

07
catalog

Milestone Mania

On April 9, 2007, we'll mark the 15th anniversary of our first miniature spectrometer sale – quite an accomplishment for a bunch of dreamers who originally worked out of a shed (we couldn't even afford a garage!). To frame that accomplishment, consider this: sometime this year we'll sell our 100,000th spectrometer. Here are some milestones from along the way:

- 1989** Ocean Optics is incorporated in Dunedin, Florida, a lovely town on the Gulf of Mexico, thus beginning a long history of people asking us why we named a spectrometer company "Ocean" Optics.
- 1992** The "World's First Miniature Spectrometer" is sold to Los Alamos National Laboratories. The guy who sells the system also builds it, packs it, and drops it off at UPS. Fortunately, it's not his turn to take out the trash that day.
- 1993** The S1000 Spectrometer earns the company's first Photonics Circle of Excellence Award.
- 1995** Our booth space at the PITTCON show exceeds our headquarters office space (750 square feet). Four employees ask to move their desks to the booth.
- 1999** We establish a Thin Films Division, securing a supply of optical components and expanding into new markets with a patented technology for patterned thin film filters.
- 2000** First overseas office, in Europe, is founded. In the States, everyone immediately asks to have off the month of August. (Just kidding!)
- 2001** Founder Mike Morris turns 50 during PITTCON. We celebrate by building a pirate ship (really) for our booth, donning foppish pirate shirts, and throwing a parade in the streets of New Orleans complete with motorcycle escort, jazz band and (of course) beads.
- 2003** Our Laser-induced Breakdown Spectrometer wins our third Photonics Circle of Excellence Award.
- 2005** SeaChanger, a color-changer technology from our Thin Films Division, is awarded the Entertainment Services & Technology Association's Dealers' Choice Product Award for Equipment. Six months later, SeaChanger makes its Broadway debut in TARZAN®.
- 2006** Our company establishes its first Asia-based Sales, Service & Support Office in China.
- 2007** The Jaz family of flexible sensing modules – a new concept in optical sensing – has a dazzling debut at Photonics West. The show is the most successful in company history.

Contact Information

Worldwide Headquarters

830 Douglas Avenue
Dunedin, FL 34698
USA

Tel 727.733.2447
Fax 727.733.3962
Info@OceanOptics.com
Orders@OceanOptics.com

Worldwide Sales, Service & Support Locations

See page 5 for contact information for all of our Sales, Service & Support locations including Europe and Asia.

Expanded Service Hours

8 a.m to 8 p.m. (EST)
Mondays - Thursdays

8 a.m. to 6 p.m. (EST)
Fridays

Real People, Real Answers

Call Ocean Optics and discuss your optical sensing needs with one of our knowledgeable Applications Scientists.

727.733.2447

Ordering Information

Terms:

Net 30 days with credit approval. Contact us for further information. All shipments are delivered EXWORKS, Dunedin, Florida, USA. For all shipments into Florida, we are required to charge sales tax unless a valid resale certificate is received prior to shipment. Fax resale certificates to our Accounting Department at 727.734.0957. Specifications, descriptions, ordering information and item codes described herein are subject to change without notice. These commodities, technology or software are to be exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. law prohibited.

Pricing:

Our Worldwide Pricing Policy ensures that a single, universal price applies to every Ocean Optics product, regardless of where it's sold. While extra costs due to currency exchange, and customs, shipping and other costs are borne by the customer, they should not be confused with a product's selling price. We adopted this policy to provide clients with relief from excessive add-on costs that others pass on to overseas customers. Here's some additional tips about pricing:

- All prices are subject to change without notice.
- For the most up-to-date pricing, contact us at 727.733.2447 or visit our website at OceanOptics.com.
- We honor the pricing cited in a quotation for 30 days.
- You can purchase Ocean Optics products from any of our four locations around the world (for contact information, see page 5), from an Ocean Optics distributor (visit www.oceanoptics.com/corporate/distributors.asp for a complete contact list) and from VWR (visit www.vwr.com).
- Pricing for some light sources and accessories manufactured in Europe are subject to exchange rates, and vary frequently.

Credit Cards:

Ocean Optics accepts American Express, MasterCard and VISA credit cards.

Shipping:

Shipping charges are the responsibility of the customer. Orders are shipped UPS Ground, unless otherwise requested. Customers may reverse shipping charges to use the carrier of their choice.

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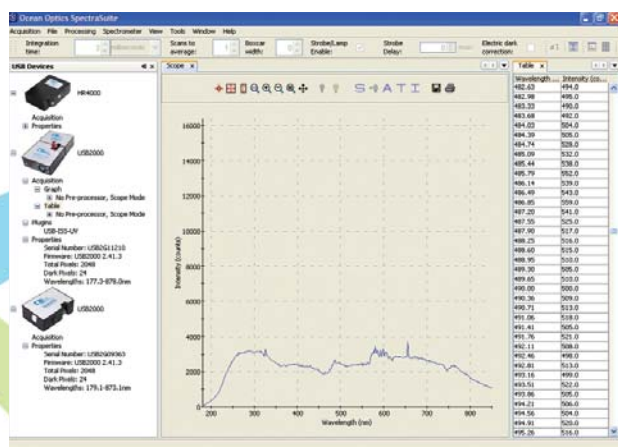


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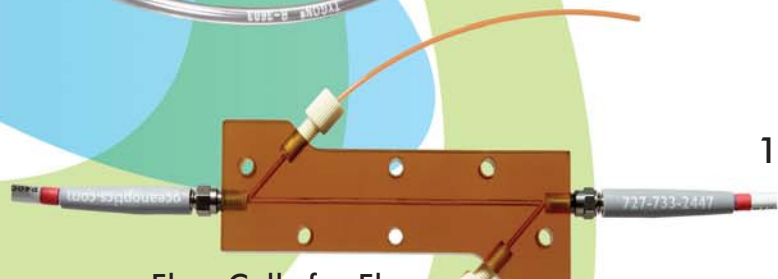
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Our Value Proposition



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15 Years of Bringing Answers to Light

What Really Matters

We value the opportunities to learn and to grow -- and to expand the frontiers of optical sensing -- that come from partnership. Recognizing and seizing these opportunities is what Ocean Optics is all about -- and is reflected in an open, collaborative approach that appeals to everyone from the innovators and early adopters to the skeptics and the traditionalists.

Ocean Optics in 2007: 100,000 Spectrometers!

Founded in 1989, Ocean Optics manufactures miniature fiber optic spectrometers and accessories, optical sensors, optical fibers, and thin films and optics. Our palm-sized fiber optic spectrometer -- "the world's first miniature fiber optic spectrometer" -- has spawned dozens of imitators and enabled thousands of optical-sensing applications across a variety of industries and disciplines. We've never been much for self-congratulation, but Ocean Optics will mark two major milestones in 2007: the 15th anniversary of our first sale, and the 100,000th spectrometer sold since 1992. So we've paused to reflect:

- We started in 1989, when our founding fathers, a group of university researchers, developed a fiber optic pH sensor to study the role of the oceans in global warming. Later, a Small Business Innovation Research grant from the U.S. Department of Energy led to the development of the world's first miniature fiber optic spectrometer.
- Our first commercial sale was in April 1992, to a researcher at Los Alamos National Laboratories named Ed Kaukell. Ed purchased an S1000 Spectrometer, which he used in an application involving plutonium. Years later we tracked down that first spectrometer -- no, it's not radioactive -- and now display it at company headquarters.
- In 1993, our S1000 Miniature Fiber Optic Spectrometer earned the Photonics Circle of Excellence Award, which recognizes innovation in photonics. We also won the award in 2000 and 2003.
- Our original miniature fiber optic spectrometer, the S1000, retailed for \$1,800 and required an additional \$500 A/D Converter. Its modern equivalent, the USB4000 Spectrometer, retails for just \$2,200 and includes an onboard A/D Converter.
- At the end of 1992, we had about 20 items in our product line. Today, we offer nearly 1,200 spectrometers and accessories.
- NanoDrop Technologies purchased our 50,000th spectrometer, a milestone we celebrated in January 2005. NanoDrop, a Delaware-based supplier of UV-VIS spectrophotometers for extremely small-volume sampling, is a prototypical Ocean Optics customer: a small team of researchers with an



NanoDrop Technologies founder and engineering director, Charles Robertson, celebrates our 50,000th spectrometer sold in 2005.

interesting application, the passion and know-how to make it happen, and an appreciation for the advantages of size, cost and flexibility that our spectrometers provide.

- If you took all 100,000 spectrometers and laid them end-to-end, the line would stretch for nearly eight miles.
- The optical benches of the 100,000 spectrometers project spectra across approximately 200 million detector pixels.

From its humble beginnings as a garage-shop operation with just a handful of products, Ocean Optics has grown to two manufacturing facilities and four Sales, Service & Support locations worldwide selling nearly 1,200 unique products. Our spectrometers have been used in thousands of applications, from the volcanologist who duct-taped the spectrometer to a bicycle helmet as he ventured inside an active site to monitor sulphur dioxide, to the NASA researcher who strapped the spectrometer to a reentry rocket to measure its exhaust plume.

Thanks to the thousands of Ocean Optics customers who have helped us achieve such milestones!

Ocean Optics Vision Statement

To expand the frontiers of optical sensing and make it the foundation on which innovative, life-changing ideas are built.



Worldwide Sales, Service & Support

From our humble beginning as a garage-shop operation with a handful of dreamers and too many bills, we've grown to six sales and manufacturing facilities worldwide supported by over 200 employees. Recent developments include the expansion of our customer service and technical support departments at headquarters and the addition of full-service sales and support offices in Europe and Asia.

Worldwide Headquarters: Dunedin, Florida, USA

Worldwide headquarters in Dunedin, Florida (at right), are home to our Sales & Marketing, Customer Service, Technical Support, Engineering and R&D, and Accounting and Human Resources Departments. Our three-story, 27,000-square-foot facility on the Gulf of Mexico is a 35-minute drive west of Tampa and is conveniently located near major airports.

Address: 830 Douglas Ave., Dunedin, FL 34698 USA

Telephone: 727.733.2447

Fax: 727.733.3962

Email: Info@OceanOptics.com (general sales inquiries)

Hours: 8 a.m. to 8 p.m. EST Monday-Thursday

8 a.m. to 6 p.m. EST Friday



This 27,000-square-foot facility has been company headquarters since 1998.

Asian Operations: New Office Opens in China

Ocean Optics is excited to announce that it has established a full-time presence in Asia. Ocean Optics Asia opened its Sales, Service & Support office in Shanghai, China to support rapidly growing markets in Asia. This new office provides sales consultations and technical support; training services; and enhanced support for OEM, distributor, academic and research lab customers.

Address: 666 Gubei Rd, Kirin Tower, Suite 601B, Changning District, Shanghai 200051, People's Republic of China

Telephone: +86 21-6295-6600

Fax: +86 21-6295-6708

Email: Sun.Ling@OceanOptics.com

Hours: 9 a.m. to 6 p.m. CST Monday-Friday



Sun Ling, Ph.D., Director of Asia Operations for Ocean Optics, and her new staff of application scientists operate in the Changning District in Shanghai.

European Operations: 7-Year Anniversary for OOBV

Established in 2000, Ocean Optics B.V. is a full-service subsidiary of Ocean Optics dedicated to serving customers and prospects in Europe, the Middle East and Africa. The office is located in Duiven, The Netherlands, just outside of Arnhem. Ocean Optics B.V. provides sales and application assistance and technical support for the entire line of Ocean Optics products.

Address: Geograaf 24, 6921 EW Duiven, The Netherlands

Telephone: +31 (0) 26 319 0500

Fax: +31 (0) 26 319 0505

Email: Info@OceanOptics.eu

Hours: 8:30 a.m. to 5 p.m. CET Monday-Friday



Kees van de Steeg, Managing Director of Ocean Optics B.V., has nearly 30 years of experience in the optoelectronics industry.

European Operations: Old Friend Now a Part of the Family

In 2006, Mikropack GmbH, an innovative developer and manufacturer of light sources, photonics accessories and metrology systems, became part of the Ocean Optics family. Mikropack adds depth and experience to our presence in Europe by providing support for our spectrometers and accessories in Germany, Switzerland and Austria, and continues to sell and support its thin film and plasma-emission metrology systems.

Address: Maybachstrasse 11, D-73760 Ostfildern, Germany

Telephone: +49 (0) 711 34 16 96-0

Fax: +49 (0) 711 34 16 96-85

Email: Sales@Mikropack.de

Hours: 8 a.m. to 5 p.m. CET Monday-Friday



Co-presidents of Mikropack, Gerald Nitsch and Dieter Steck, accept a Baden-Wuerttemberg award for enterprise companies. For over a decade, Mikropack and Ocean Optics have collaborated successfully on engineering and sales projects. Now Mikropack is Ocean Optics.



Worldwide Distribution Network

Trusted Experience Around the World

We have an extensive network of domestic and international distributors who provide comprehensive pre- and post-sales service for our line of optical-sensing products. Our distributors offer considerably more than simple order-taking: they provide a local source for applications expertise and sales consultation, as well as hands-on demonstrations of our spectrometers and accessories. Many of them are former customers who liked our products so well they jumped at the opportunity to join our sales network. For an up-to-date list of Ocean Optics distributors, click on the "Worldwide Distribution" link at OceanOptics.com.

Ocean Optics Distributors & Worldwide Pricing

Our distributors abide by our "Worldwide Pricing" policy, which ensures that a single, universal price applies to every Ocean Optics product. Extra costs due to currency exchange, customs duties and shipping charges should not be confused with a product's selling price. We originated this policy to provide clients with relief from excessive add-on costs that other manufacturers and distributors pass on to overseas customers. Worldwide pricing is prominently displayed on our website and



Distributors from around the globe met in Singapore for training in November 2006. Such events are scheduled throughout the year.

in our print catalog. We adhere to fair business practices and employ these principles in the Ocean Optics worldwide distributors agreement.

Join Our Distributor Team

Our distributors come from a variety of backgrounds, experiences and cultures, yet they all have one thing in common: a passion for using Ocean Optics technologies to help their customers solve an array of optical-sensing applications challenges. We're always looking for skilled and enthusiastic people to help us sell the most innovative line of photonics products in the market. If you are interested in becoming part of our worldwide distributor network, contact us at DistributorSupport@OceanOptics.com -- we'd love to discuss opportunities. If you qualify as a distributor, here are some of the benefits you'll enjoy:

Discounted Pricing

Qualifying distributors reap the benefits of discounted pricing on spectrometers and accessories. Discount rates -- based on gross margin of the product -- depend on sales volume, which is reviewed annually and adjusted to reward top performers. Also, top-tier distributors can take advantage of prospect-generation and marketing support to promote Ocean Optics products.

OEM Client Development

Our spectrometers are used in thousands of OEM devices in various industries worldwide. We offer special pricing for distributors who prospect and manage OEM clients within their territories. Under this unique margin-sharing program, OEM client development offers a premium profit advantage for both Ocean Optics and the distributor.

Technical Training

Because selling Ocean Optics products requires skilled applications engineers who perform a significant consultative

role, we provide distributors with regular technical training. Nick Sebastian, Worldwide Distributor Manager, and Gary Manche, Training Manager, are available to provide provide sales and technical support for new programs and products.

Sales & Marketing Support

Ocean Optics makes available to distributors various promotional items, and encourages distributor participation at major tradeshows. For top-tier distributors we offer cooperative marketing support, in the form of expertise, cost-sharing and other collaborative efforts on tradeshows and other promotional items. Top-tier distributor support also includes sales prospect lead-sharing and market-coordination programs designed for greater territorial coverage and customer support.

Lead Sharing

Ocean Optics marketing efforts generate thousands of prospects. Top-tier distributors qualify for lead sharing, an exchange of leads between Ocean Optics and the distributor. Lead sharing ensures that our overseas prospects receive rapid response to their sales and technical needs.



Nick Sebastian, Worldwide Distributor Manager.

Contact Information

To find a distributor, visit www.oceanoptics.com/corporate/distributors.asp. For information on distributing our products, contact Nick Sebastian at DistributorSupport@OceanOptics.com.



OEMs & Application Developers

Build your Success Using Ocean Optics Products!

Do you have a great idea for a commercial product that uses optics? Maybe you've developed a new analytical technique, or perhaps your company is already a world leader in spectroscopy-based instrumentation. Whether you're developing a groundbreaking new analytical technique or designing the next-generation system for a demanding and sophisticated market, Ocean Optics has the skills, service, and knowledge to help you succeed. We can enable your success with our innovative Original Equipment Manufacturer (OEM) Partner Program. It is designed to guide you through product development and launch by giving you the two things you need most during this crucial period: 1) discounted pricing; and 2) customized advice on how to get the most out of your Ocean Optics equipment.

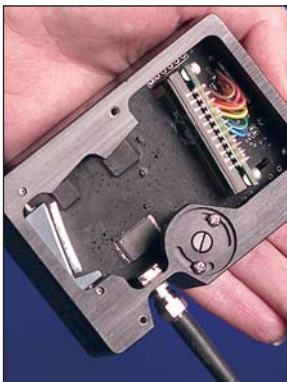
Full-service Support

As a member of the OEM Partner Program, you get free consulting services from applications specialists with the knowledge and connections to assist you from the beginning of your product development cycle through launch and ramp-up. The result is a high-performance, low-cost product designed for manufacturability and quality field performance. In addition, OEMs have at their disposal an array of a la carte R&D services, from optical design and software engineering to prototype development and testing and validation. In addition, members receive these added-value benefits:

- Discounts without minimum orders or commitments
- Free access to all user interface and driver software programs (a \$1000+ value)
- Order status notification and expedited order fulfillment
- Development assistance from the technical experts
- Access to software development consultants with Ocean Optics experience
- OEM Interface Guide, wiring diagrams, register maps and spectrometer pin-out information
- Co-marketing opportunities through our website, tradeshow and our distribution network

Modular Components

Ocean Optics offers a comprehensive tool kit of optical components and accessories that can be combined to serve markets in medical diagnostics, analytical chemistry, semiconductor process monitoring, and even intensity measurements. By mixing and matching optical bench



components such as gratings and slits, one optical bench alone can be configured more than 500 different ways!

Discounts & Savings

Our goal is to make you successful; we want our OEMs to grow. The annual OEM Developer's Program membership starts at \$999 -- a great value even for a small OEM. We also have outstanding volume



NanoDrop Technologies, an Ocean Optics OEM, manufactures and sells unique instruments that provide 1 µl photometric analytical capability for labs throughout the world. The company's patented retention system uses inherent surface tension and fiber optic technology for highly accurate quantitation of nucleic acids, proteins, and a wide variety of other chromophores and fluorophores, without the need for cuvettes or capillaries. This novel technology is an essential component in today's research environment as investigators continue to perform molecular analysis on ever-smaller amounts of material. For more on NanoDrop, visit www.nanodrop.com or call 302-479-7707.

discounts for those with larger needs. With added volume comes added benefits:

- Volume pricing to ensure you can provide the best value to your customers -- with discounts of up to 50%!
- Flex-Order -- Our flexible product delivery program that allows you to adjust delivery times and forecasts easily
- Quarterly Account Status meetings to ensure we continue to meet your needs
- A subscription to Ocean Insider -- our OEM Newsletter that keeps you informed on new products and services.

Contact Information

For more information on OEM opportunities, call us at 727.733.2447 and ask for our OEM Sales Manager, or email us at oem@oceanoptics.com.

Number of Units per Year	Discount	USB4000-UV-VIS with OEM Discount*
1	Gross Margin	\$2,649
5	10%	\$2,384 per unit
10	15%	\$2,251 per unit
20	20%	\$2,119 per unit
35	25%	\$1,986 per unit
50	30%	\$1,854 per unit
75	35%	\$1,721 per unit
100	40%	\$1,589 per unit
150	45%	\$1,456 per unit
200	50%	\$1,324 per unit
250	53%	\$1,245 per unit
500	55%	\$1,192 per unit

* OEM Discount Price does not include the OEM Developer's fee of \$999 in the first year and the \$599 renewal fee each year thereafter.



Educational Spectroscopy Grants



Innovations in Educational Spectroscopy Grant Program

Today's students are the most tech-savvy generation in history. Tap their enthusiasm by bringing the power of optical sensing to the modern teaching lab. The *Innovations in Educational Spectroscopy Grant Program* provides cost-sharing resources to educators and researchers to promote the use of fiber optic spectroscopy in curricula and research. This is a great option for educators on a limited budget, or for those outfitting an entire lab.

Cost Sharing on Proposals for Extramural Funding

We provide cost-sharing support for proposals to federal, state or private institutions for the express purpose of purchasing our products to be used in science or engineering teaching. Cost sharing varies according to the product. There is no limit to the total cost-sharing amount.

Cost Sharing for Ocean Optics Equipment Used in Curricula

We provide cost sharing for purchasing products used to develop new science and engineering curricula. Cost sharing varies according to the product. Funding may come from any source, including an organization's internal funds; however, awards are based on the strength of the applicant's technical proposal and the novelty of the proposed curricula. The developed materials must be made available for publication at OceanOptics.com, so that other educators may have access to the information.

Trade-in Savings

Our trade-in programs provide discounts for all educational institutions on the purchase of CHEM4-series Spectrophotometers for the purpose of setting up a lab. Institutions qualify for discounts on our CHEM4-series Spectrophotometers, provided the institution trades in an old spectrometer, regardless of its condition.

Eligibility

Cost sharing is available to any qualified non-profit learning institution. For more information, or to request an application:

- Visit us online at OceanOptics.com/Corporate/Grantprogram.asp.
- Call an Applications Scientist at 727.733.2447.
- Email us at Education@OceanOptics.com.
- For details on the Grant Program outside of the U.S., contact your regional Ocean Optics Sales, Service & Support office.

\$1,500,000 Worth of Grant Winners

Since 1999, we have awarded over \$1.5 million to learning institutions for funding spectroscopic applications such as:

- Analysis of surface water samples
- Identification of organic dyes in textiles
- Chlorophyll absorbance and its relationship to photosynthesis
- High school-level introduction to principles of nanotechnology
- Visible tissue reflectance as a diagnostic tool in studies of the use of laser therapy for dermatological lesions
- Raman spectroscopy to analyze atmospheric pollutants
- Luminescence of mineral crystals to determine the histories of components in sedimentary rocks
- Metabolic rate, oxygen tension and hemoglobin concentration in fish
- Detection and identification of atomic emission lines from gas discharge tubes
- Measurement of ionization constants in acids and pH dyes
- Study of seaweed photosynthesis and animal respiration in aquatic chambers and under various water velocities
- Determination of DNA concentration using absorbance spectroscopy
- Fluorescence measurements of luminescent semiconductor-nanocrystal quantum dots
- Analysis of stellar and planetary absorption spectra
- Identification of organic dyes in Peruvian textiles for archaeological and ethnographic origin
- Measuring photosynthetic radiation through leaf reflectance
- Theoretical functioning and the effects of different variables on the ability of glow discharge plasmas to destroy pollutants
- Color perception of bees
- High temporal resolution measurements of volcanic degassing
- NIR analysis of the nutritional content of (yikes!) feces of various grazing animals



Education Division

Preparing Students for a Future in Science

The Spec20 -- for decades that workhorse spectrometer so ubiquitous to university labs around the world -- is yesterday's technology. At least, that's what you told us way back in 1995, when we launched the first of our PC-based, full-spectrum spectrometers for teaching labs. Today, we've built a full line of education-friendly spectrometers, accessories and instructional resources that take students and teachers beyond the limits of old-fashioned technology and into the possibilities of the future.

Tools for the Modern Teaching Lab

Ocean Optics offers small-footprint, multi-purpose PC-based instrumentation -- and more -- to meet most any educational application requirement:

- Our fully integrated CHEM4-series Spectrophotometers come with light sources and cuvette holders that attach directly to the spectrometer or connect via fiber. See pages 36-37.
- The \$999 Red Tide is a general-purpose instrument for budget-strapped teaching labs. It is a good choice for simple visible absorbance setups. For more, see page 38.
- For users who prefer to avoid PCs, consider our educational partner Pasco and its Xplorer GLX, a datalogger and lab analysis tool in one. The GLX turns our USB-based spectrometers into PC-free systems. See page 39.
- Our modular spectrometers work well with the industry's most extensive selection of spectroscopy accessories, from cuvettes and standards to optical fibers and dip probes.

Hardware is just part of the equation. Our SpectraSuite Operating Software is a powerful yet student-friendly tool that operates in Macintosh, Linux and Windows. Our educational system hardware is also compatible with the software of our educational vendor partners, including PASCO Scientific, Vernier Software & Technology, and MeasureNet Technology, Inc.

Curricula and Other Resources

When you invest in Ocean Optics for your teaching lab or educational application, you're tapping into the collective power of 85,000+ spectrometers' worth of applications know-how. What's more, we've begun to capture that knowledge in a variety of easily accessible media:

- Database of curricula from our Educational Spectroscopy Grant Program awardees
- The Basics of Spectroscopy Measurements video on CD-ROM. See page 36 for more on the EDU-SPEC-CD.
- An 84-page handbook, *Introduction to Spectroscopy in the Teaching Lab Using Ocean Optics Spectrometers*, with sample lab exercises, available in print or on CD (page 36).


"Spectroscopy 101" Educator Training

Our educator seminar is designed for teachers and department heads interested in enhancing their science teaching curriculum. (Contact Education@OceanOptics.com for details.) Here are some of the topics to be covered:

- New approaches to teaching Beer's Law, kinetics, and absorbance and transmission measurements
- Reworking your old single-wavelength spectrometer curricula to labs based on Ocean Optics spectrometers

Educational Spectrometers For the Lab or Field

Call Today: 727.733.2447
OceanOptics.com • Education@OceanOptics.com



USB650-VIS-NIR
\$1,499 Retail

CHEMUSB4-VIS-NIR
\$2,999 Retail
Educators (with Trade-in)
Just \$1,499

CHEMUSB4-UV-VIS
\$3,999 Retail
Educators (with Trade-in)
Just \$2,499


Replace Outdated Equipment with Ocean Optics Technology

- Rapid, full-spectral analysis from 200-850 nm or 400-950 nm
- Integrated system has no moving parts to break or misalign
- Student-friendly software runs on Mac, Linux & Windows
- Small size frees up bench space and enables field use



Prepare Students For a Future in Science!

Need to Beef Up Your Curricula?
Dr. Q's the Man With the Plan!
Reach him at MondeQ@OceanOptics.com



ocean optics inc.
First in Photonics™

Monde Qhobosheane, Ph.D.



You may have seen our new promotions featuring "Dr. Q" Monde Qhobosheane, who received his Ph.D. from the University of Florida and taught chemistry at St. Petersburg College before coming to Ocean Optics to lead our Educational Division. Email Dr. Q at Education@OceanOptics.com.

- Getting the most out of your modular spectrometer -- how one spectrometer design can be easily configured to explain principles in chemistry, physics or other disciplines

Multiple Options, Maximum Convenience

Our low-cost, small-footprint educational spectrometer systems are now available directly from Ocean Optics or through one of our educational vendor partners:

- PASCO Scientific (pasco.com)
- Vernier Software & Technology (vernier.com)
- MeasureNet Technology Ltd. (measurenet-tech.com)
- MicroLab, Inc. (microlabinfo.com)
- Nicholl Education (nicholl.co.uk)
- SK Science Kit & Boreal Laboratories (sciencekit.com)
- VWR Education (vwreducation.com) network of brands, including Sargent-Welch and Scholar Chemistry
- WARD'S Natural Science (wardsci.com)



Customer Service: Accessible & Flexible

Making Great Service Our Hallmark

We designed our products by first imagining how we would sell them -- i.e., we actually pictured ourselves talking to our prospects, discovering their needs and wants, and offering them the best solutions possible. As researchers ourselves, we realized the key to serving you well was flexibility -- flexibility in our modular products, flexibility in our attitude, flexibility in the way we handle your needs. We realize that great service is not a slogan -- it's an attitude, a philosophy.

Before the Sale: R&D and Applications Support

Our Applications Scientists are consultants in the best sense of the word, because they're guided by one central question: Why? If we don't ask you what your sample is and why you want to measure it, we haven't given you our best effort.

Sentiment is all well and good, you say, but what specifically can you do for me? Well, consider our pre-sale support:

- **R&D.** Prospects interested in developing new applications using our technology can draw on the resources of our OEM and Applications Groups, which comprise sales, engineering and technical support resources. We offer optical and electronic design services, software and firmware engineering, testing and validation services, and rapid prototyping.
- **Applications.** Our Applications Scientists take ownership of your most challenging applications needs. When you ask if our spectrometer can measure a certain sample, we respond, "Well, we don't know -- what is this sample and why do you want to measure it?" In short order, we have configured a system to measure the sample, we have put your order in the queue, and we've perhaps even started to work on a new accessory that we'll need to fill the order.
- **Tradeshows and Seminars.** What better opportunity to see our products in action than to attend a tradeshow? Our combined locations will exhibit at nearly 100 tradeshows worldwide this year (for a schedule of shows in the U.S., see www.oceanoptics.com/tradeshows.asp). In addition, we will host various seminars throughout the year, including our Customer Forum and Educator Training. Check OceanOptics.com for details.
- **Sales & Service.** With offices in Europe, Asia and the United States, and a network of distributors around the world, our service reach is truly global. In the States, we offer expanded service hours (Mondays-Thursdays 8 a.m.-8 p.m. and Fridays 8 a.m.-6 p.m. EST) and late-day shipping options. Customer sales & service representatives are available to take orders, provide order status, relay pricing and product information, and handle any basic service request. We are available via email and soon will add e-commerce and other multimedia services to our website. For a list of our locations see page 5 or visit oceanoptics.com/contactus.asp.

After the Sale: Customer Service & Tech Support

Our relationship with the customer doesn't end once the order goes out the door. In fact, our assistance after the sale is often where we provide the most value to our customers. Whether it's helping you to get started, or troubleshooting a challenge you're facing, we offer post-sale support in various guises:

- **Help with the "Little" Things.** Contact our Customer Sales & Service Department (727.733.2447 or Orders@OceanOptics.com) for questions regarding order status, delivery times, shipping charges and more. And when you call, you'll speak to an actual person.
- **Troubleshooting Challenges.** If you run into an issue with your order, our Applications Scientists and Technical Support staff (TechSupport@oceanoptics.com) can help. The former are especially useful for help with your configuration or experiment; the latter can assist with getting started, hardware-software compatibility, firmware and software programming issues and more.
- **Repairs and Returns.** Occasionally, orders don't work out exactly as planned. If you need a Return Merchandise Authorization (RMA) for a repair or an upgrade, contact us at 727.733.2447 or Repairs@oceanoptics.com. It's rare that spectrometer components or accessories fail; more often than not, our RMAs cover changes in spectrometer configuration, bench upgrades and the like.

Additional Resources

We provide readily accessible technical and support information on our website and in other media:

- Our Software & Technical Resources CD ships with every order, and contains manuals, operating instructions and software. These materials are also conveniently available online at oceanoptics.com/technical.asp.
- Engineering-level documents are also available online, at oceanoptics.com/technical/engineeringdocs.asp. This is where you'll find information on topics such as CCD detectors and linearity, lamp stability and USB adapter interfaces.
- Click the APPLICATIONS button at OceanOptics.com to view an Applications Database of journal articles that reference our products. And it's always fun to do a search at <http://scholar.google.com>. The last time we looked, there were over 5,000 listings for Ocean Optics spectrometers.
- Other resources include a UV-Vis Spectral Database CD, short video clips on basic spectroscopy measurements, and a handbook in both print and CD formats on the use of spectroscopy in the teaching lab. For details, contact an Applications Scientist.



How Are We Doing?

We love hearing from our customers. Your feedback helps us serve you better. Please direct your questions, concerns and comments to Info@OceanOptics.com or write to us at Ocean Optics, Inc., 830 Douglas Ave., Dunedin, FL 34698 USA.



Collimating Lenses

The 74-UV and 74-VIS Collimating Lenses screw onto the end of SMA 905-terminated fibers and other sampling optics to convert divergent beams of radiation (light) into a parallel beam. The optical fibers we sell have a field of view (FOV) of $\sim 25^\circ$ -- an acceptance angle that may not be appropriate for some experiments. Collimating lenses are adjustable, providing FOV angles from collimation (near 0°) to $\sim 45^\circ$. Without the collimating lenses, the light would disperse more than is required for efficient transmission and collection of the signal.

Focus the Lamp's Collimating Lens

In order to obtain accurate data, the light entering and exiting a sample by means of a fiber/collimating lens assembly must be well collimated. Here are instructions for adjusting the focus of the collimators in a typical spectrometer setup.

1. Connect to the light source the fiber that you're going to use as the illumination fiber in your setup. The female SMA 905 Connector of the fiber must be screwed all the way into the male connector of the lamp.
2. Turn on the lamp and inspect the beam emitted from the other end of the fiber by pointing the fiber at a white piece of paper. The distance is not too critical but should be at least 3 inches from the surface.
3. Loosen the setscrew on the fiber barrel of the light source with an Allen wrench.
4. Slide the inner barrel of the collimating lens until you see an even intensity across the beam spot. The spot should be uniform in intensity and color.
5. Once the inner barrel is positioned so that a well-focused, uniform spot is obtained, tighten the setscrew. Don't put down the fiber and then tighten the setscrew as you may lose the focus.

Focus the Next Collimating Lens

6. The illumination fiber is still connected to the lamp and the lamp is on. Take the second collimating lens in your setup (removed from a cuvette holder, for example) and screw it securely onto the other end of the fiber. Point this end of the fiber at least 2 meters from a wall.
7. Repeat Steps 3, 4 and 5. Then remove the lens from the end of the fiber and install it back into your setup (back into a cuvette holder, for example).
8. Continue to adjust the focus of the other collimating lenses in your setup.

Spectral Identity

Absorption/Emission for Fluorophores (continued)

Fluorophore	Absorption in nm	Emission in nm
CL-NERF (Ratio Dye, pH)	504/514	540
Cy2™	489	506
Cy3.5™	581	598
Cy3™	514	566
Cy5.5™	675	695
Cy5™	649	666
Cy7™	710,743	767,805
Dabcyl	453	
Dansyl Cadaverine	335	518
DAPI	359	461
Di-4-ANEPPS	496	705
Di-8-ANEPPS (non-ratio)	488	605
	498	713
DiA (4-Di-16-ASP)	456	591
DIDS	341	415
Dil (DiIC18(3))	549,551	565
Dinitrophenol	349	
DiO (DiOC18(3))	484,487	501,502
DM-NERF (Ratio Dye, high pH)	497/510	540
ELF 97	345	530
Eosin	524	545
Erythrosin	529,532	554,555
Ethidium Bromide	510,523	595,605
Ethidium homodimer -1 (EthD-1)	528	617
Europium (III) chloride	337	613
Fast Blue	360	440
Fluo-3	480-506,506	520,527
Fluo-4	494	516
Fluorescein (FITC)	490,494	520,525
Fluoro-Gold (Hydroxystilbamidine)	361	536
FluorX	494	520
FM 1-43™	479	598
Fura Red™ (high pH)	572	657
Fura-2, high calcium (Excitation ratio dye)	335	505
Fura-2, low calcium (Excitation ratio dye)	363	512
GFP (S65T)	498	516
Hoechst 33258	345	487
Hoechst 33342	347	483
JC-1	514	529
JO-JO-1	530	545
JO-PRO-1	532	544
Lucifer Yellow	425,428	528,536,540
Lyso Tracker Green	504,534	511,551
Mag-Fura-2 (Ratio Dye, Ca2+)	369/329	508
Mag-Fura-2 (Ratio Dye Mg2+)	369/330	511/491
Mag-Fura-5 (Ratio Dye, Ca2+)	369/330	505/500
Mag-Fura-5 (Ratio Dye, Mg2+)	369/332	505/482
Magnesium Green	506,507	531
Marina Blue	362	459
Mitotracker Green FM	490	516



Absorption/Emission for Fluorophores (continued)

Fluorophore	Absorption in nm	Emission in nm
Mitotracker Orange	551	576
NBD	466	539
Nile Red	515-555,559	590,640
Oregon Green™	503	522
Oregon Green™ 488	490,493	514,520
Oregon Green™ 500	497	517
Oregon Green™ 514	506	526
PKH26 (Sigma)	551	567
POPO-3	533	574
PO-PRO-3	539	567
Propidium Iodid (PI)	(305), 536,538	617
Pyrene	360	387
QSY 7	560	591
Rhod-2	552	576
Rhodamine 110	496,497	520
Rhodamine 123	507	529
Rhodamine 6G	525	555
Rhodamine B	540	625
Rhodamine Green	502	527
Rhodamine Phalloidine	542	565
Rhodamine Red	570	590
R-phycoerythrin (PE)	565	578
SITS (Ion Channels)	336	436
SNAFI-1 (Ratio Dye, pH)	508/540	543/623
SNARF1 Excitation and emission ratio dye	576/548	635/587
Sodium Green Na+, K+	506,507	532
SpectrumGreen (Vysis)	497/30, 509/31	538/44,524/56
SpectrumOrange (Vysis)	559/38,560	588/48
SPQ (6-methoxy-N-(3-sulfopropyl)	344	443
SYTO 11Dye for DNA, RNA	508,510	527,530
SYTO 13Dye for DNA, RNA	488,491	509,514
SYTOX Green (Nucleic Acid Stain	504	523
SYTOX Orange (Nucleic Acid Stain	547	570
Tetramethylrhodamine (TRITC)	555	576
Texas Red™	595	620
TO-PRO-1	515	531
TOTO-1	514	531,533
YFP (Yellow Fluorescent Protein)	513,520	527,532
YO-PRO-1	491	506
YOYO-1	491	508,509

Phosphorescence & Fluorescence

Phosphorescence and fluorescence are closely related subcategories of luminescence. The difference between the two is in the nature of a material's ground and excited states.

In a singlet excited state, the higher-energy orbital electron spins opposite the lower-energy orbital. The two electrons are considered "paired." In a triplet state, the electrons are "unpaired," and spin in the same direction. A return to the ground state from a singlet excited state does not require one of the electrons to change its spin orientation; a return from a triplet state to the ground state does require an electron's spin orientation to change.

Fluorescence is the photonic emission that occurs when the higher-energy electron in a singlet state returns to the lower-orbit electron. The laws of quantum mechanics permit this rapid transition at a rate near 10^{-8} second.

The fluorescence lifetime is the average period of time that a fluorophore remains in the excited singlet state. By comparison, phosphorescence emission occurs as the electronically excited condition of a material in the triplet state returns to the singlet ground state. Again, the laws of quantum mechanics prevail, and the probability of this transition is lower. The lifetime of an excited triplet state is much longer than that of an excited singlet state, producing phosphorescence lifetimes that range from milliseconds to seconds.

Standard & Extended Warranty Coverage

All products manufactured by Ocean Optics are warranted for one year. Ocean Optics also offers an Annual Service Package (ASP) that extends by one year the standard warranty on our spectrometers. The holder of the ASP is entitled to several benefits during the one-year period commencing with the spectrometer invoice date:

- Additional year of warranty protection and certification
- Factory calibration and certification of your spectrometer, including optical alignment, wavelength calibration, linearity calibration, stray light measurement and signal-to-noise analysis, optical resolution evaluation and baseline uniformity evaluation
- Waiver of \$250 labor charge for upgrades to your spectrometer configuration, such as changing a slit or grating
- A spiffy new Maxwell's Equations T-shirt – be the envy of all your friends, like our Ocean Optics models!



The purchase of an ASP comes with the latest Maxwell's Equations T-shirt, modeled by (left to right) Fernando Quinones, Accounting Specialist; Jada Mains, Customer Support Coordinator; Nick Sebastian, Global Distribution Sales Manager; and Ricardo Nobara De La Torre, Electrical Engineer.

Also available is a two-year extended warranty renewal option for most of our spectrometers. Enjoy all the great ASP benefits with the additional year of coverage at a steep discount.

Item	Description	For These Spectrometer Series	Price
ASP	Extends the standard warranty from 1 year to 2 years. Price is per spectrometer channel.	USB2000, S2000, PC2000, HR2000, HR2000+, HR4000, USB4000	\$250
ASP-ES	A 1-year warranty package available to customers whose original warranty has expired. Price is per spectrometer channel.	USB2000, S2000, PC2000, HR2000, HR2000+, HR4000, USB4000	\$300
ASP-R	1-year renewal option for holders of expiring ASPs; price is per channel.	USB2000, S2000, PC2000, HR2000, HR2000+, HR4000, USB4000	\$250
ASP-R-E	2-year renewal option for holders of expiring ASPs; price is per channel.	USB2000, S2000, PC2000, HR2000, HR2000+, HR4000, USB4000	\$350
ASP-NIR	Extends the standard warranty on NIR Spectrometers from 1 year to 2 years.	NIR256-2.1, NIR256-2.5, NIR512	\$1,000
ASP-QE	Extends the standard warranty on QE Spectrometers from 1 year to 2 years.	QE65000	\$750

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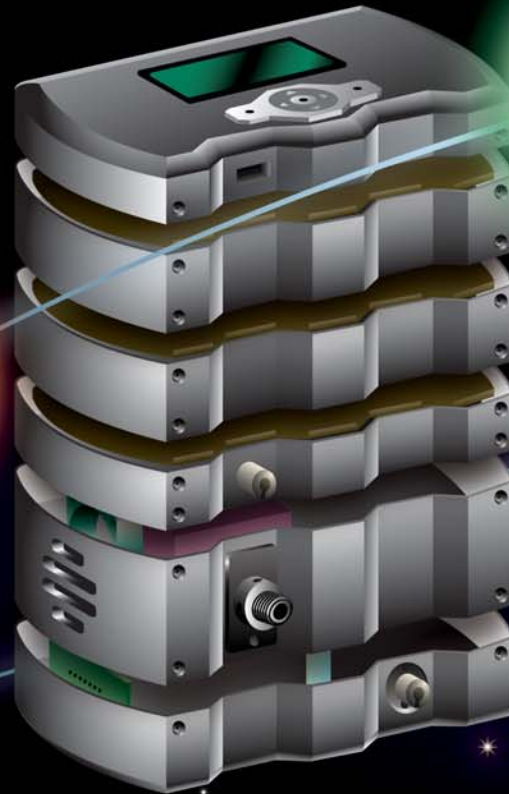
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Sensing a New World

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JAZ

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