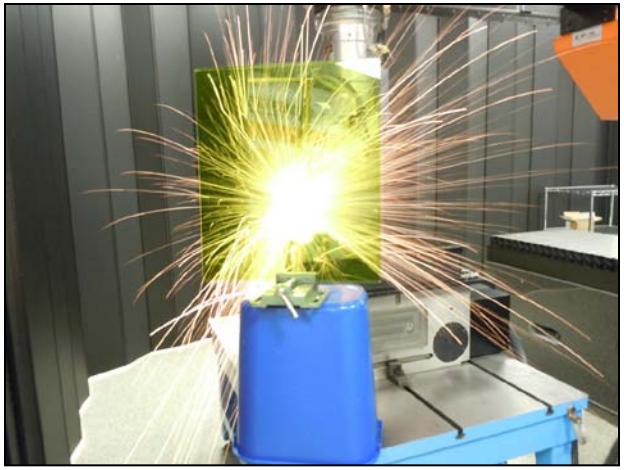
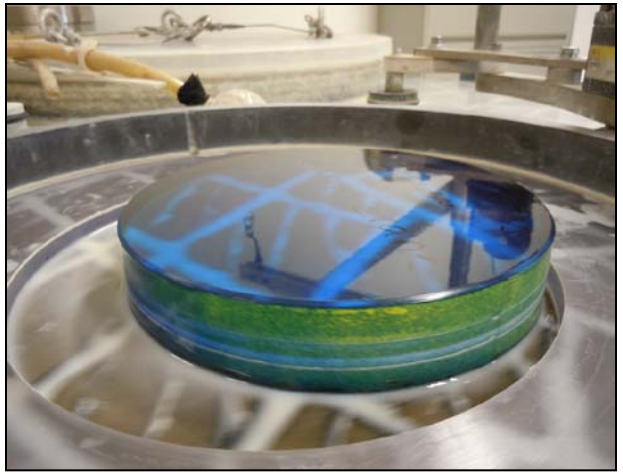
Laser-Fast News: Reporting on the World of Photonics

Laura S. Marshall,
Photonics Media

LSO Workshop, MIT, August 2011

photonics: a wide world



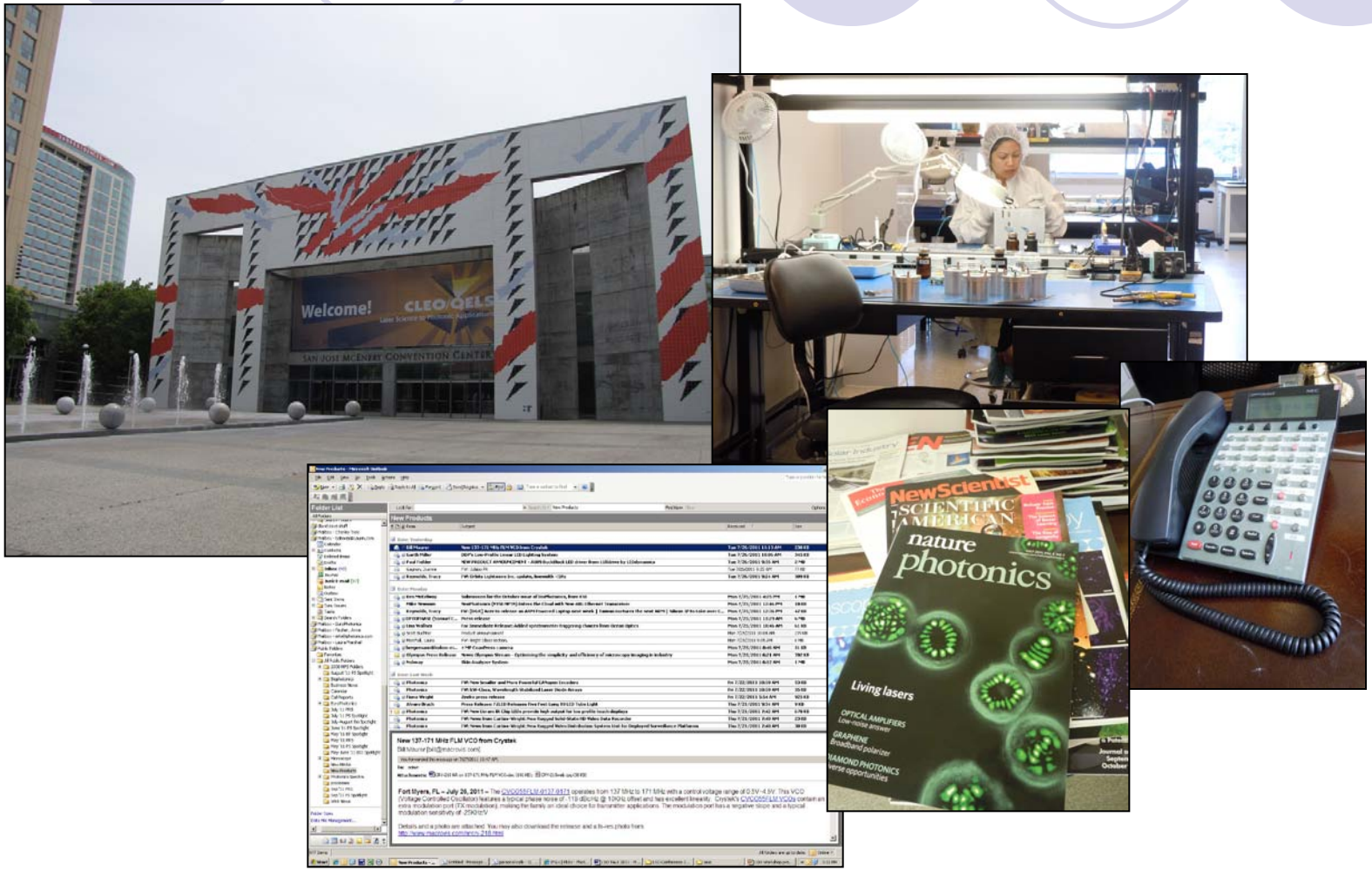


- Lasers, optics, imaging, vision, biotech, sensing, microscopy, spectroscopy and a lot more
- Endless applications: defense, manufacturing, medicine, the environment, communications, pharmaceuticals, research and more ...

your photonics news team at work


LASER
IN USE

news sources



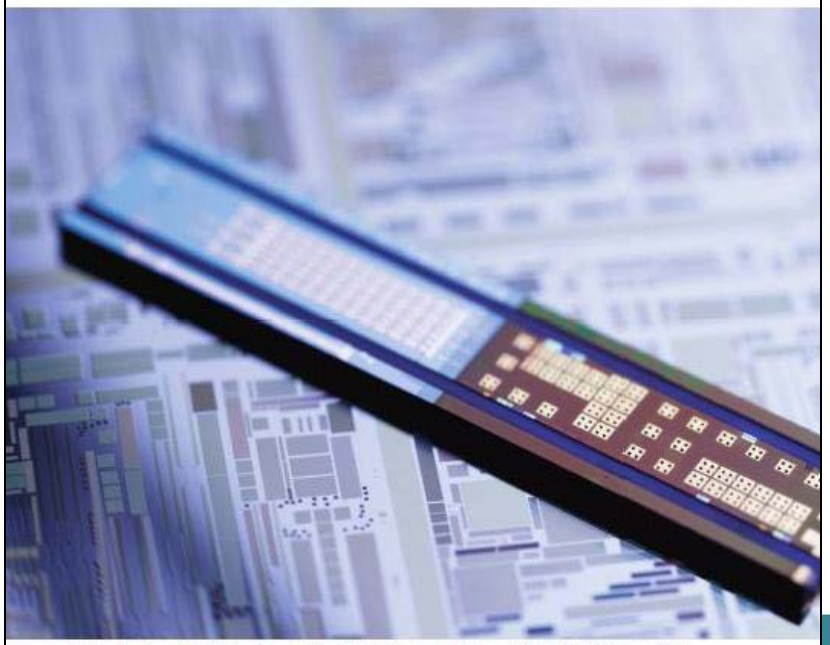
coverage

Silicon Emits the Light Fantastic (with Help)

BY HANK HOGAN
CONTRIBUTING EDITOR

Silicon may be mighty in electronics, but it's puny in photonics – so far. Researchers have resorted to such tricks as combining silicon with other semiconductors or exploiting the Raman effect to coax out coherent light.

Silicon-based lasers could someday illuminate optics, link computer chips and power chemical sensors. Years of effort have led to recent advances – especially in hybrid lasers that marry silicon to other materials – that promise commercially viable silicon lasers sometime soon. Questions remain about the yield and reliability of such lasers, but testing and continued developme
under way could address those c
In hybrid lasers, the silicon is
to form a waveguide and, perhap
the device cavity. The nonsilicon
forms the gain medium that ampl
light, resulting in a laser.
"The whole rationale for hybri
lasers, meaning, in practice, a III



A transmitter chip uses hybrid silicon lasers and other photonic devices to send data at a rate of up to 50 Gb/s. Courtesy of Intel.

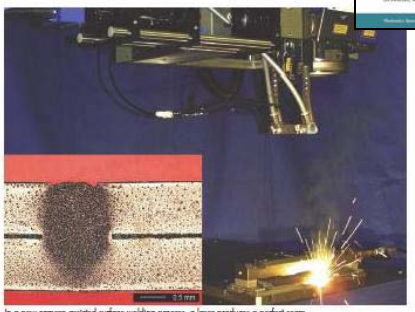
TECH
NEWS

Perfect, shallow laser welds make better car bo

FREIBURG, Germany – The corrosion problems encountered on galvanized car bodies could be a thing of the past thanks to a new process that uses a camera to generate temperature images, enabling perfectly controlled surface laser welding. This could be much more useful to car makers than full-penetration welding.

The prototype, which eliminates the expensive process of hiding welding seams that result from zinc's inability to vaporize during processing, was developed by research scientists at the IFSW Institut für Strahlwerkzeuge at University, the Institut für Grui Elektrotechnik und Elektronik University of Technology, and Institute for Physical Measurem niques.

In the process, called contro penetration welding, the laser burn right through all the sheet unlike with full-penetration we where a hole briefly forms in t pool. Instead, the weld seam is to penetrate the lower sheet wi



In a new camera-assisted surface welding process, a laser produces a perfect seam. Pictured at the bottom left is a weld seam profile – the penetration depth is controlled without damaging the bottom surface. Courtesy of Fraunhofer IPM.

Where it burned into th
to melt, the images dep
If the bottom of the me
gap between the upper
heat conduction was in
cooler point was visibl
to as the full-penetratio
the relative frequency
system can calculate th
in the lower sheet. A s
adapted the output of t
specific requirements,
loop-controlled, real-ti

An extremely rapid
needed for the process.
was integrated into eac
simultaneously to spee
of the individual image
image processing syste
sors process the data c

With the new system
analyzed 14,000 image
than the usual rate of 1
second.

Nanoscale technique designed for MS diagnosis

SANTA BARBARA, Calif. – A new nanoscopic imaging technique may lead to experimental methods for early detection and diagnosis of – and possible treatments for – pathological tissues that are precursors to multiple sclerosis (MS) and similar diseases.

Chemical engineers at the University of California have studied the myelin sheath, the membrane surrounding nerves that is compromised in patients with MS. Their findings appeared in the May 23, 2011, issue of *Proceedings of the National Academy of Sciences* (doi: 10.1073/pnas.1106368108).

Various parts of the central nervous system, including the b
with each other through
the transmission of ele
the fibrous myelin shea
electric cables or transmission lines. Defects in the molecular or structural organization of the myelin membranes lead to a reduction in transmission effi-

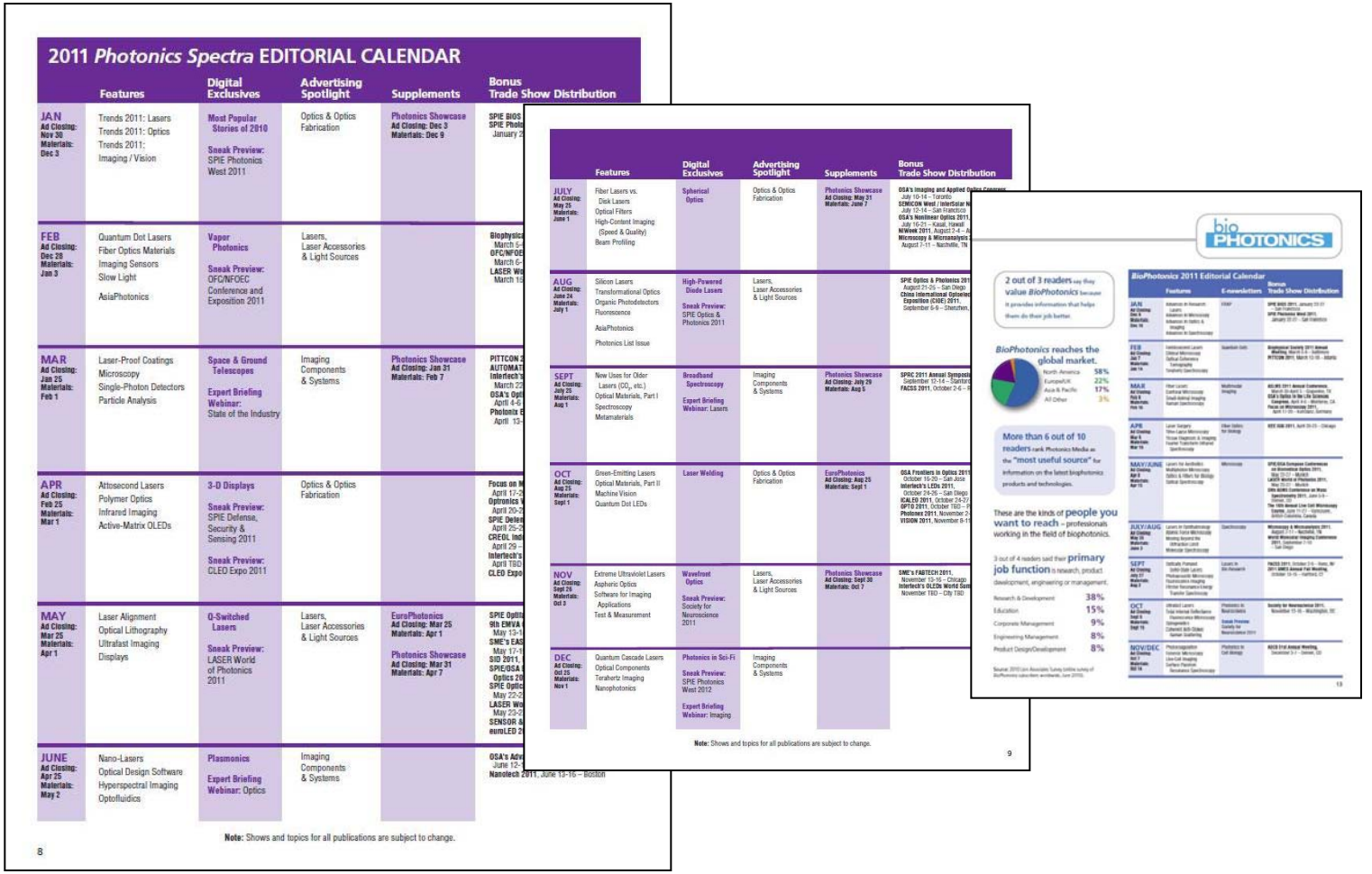
GreenLight

Solar inverter sets efficiency record

BUSINESSCAN

Q&A: Biophotonics in Europe

article planning



2011 *Photonics Spectra* EDITORIAL CALENDAR

	Features	Digital Exclusives	Advertising Spotlight	Supplements	Bonus Trade Show Distribution
JAN Ad Closing: Nov 30 Materials: Dec 3	Trends 2011: Lasers Trends 2011: Optics Trends 2011: Imaging / Vision	**Most Popular Stories of 2010** **Sneak Preview:** SPIE Photonics West 2011	Optics & Optics Fabrication	**Photonics Showcase** Ad Closing: Dec 3 Materials: Dec 9	SPIE BIOS SPIE Photo January 2
FEB Ad Closing: Dec 28 Materials: Jan 3	Quantum Dot Lasers Fiber Optics Materials Imaging Sensors Slow Light AsiaPhotonics	**Vapor Photonics** **Sneak Preview:** OFC/NFOEC Conference and Exposition 2011	Lasers, Laser Accessories & Light Sources		Biophysica March 5- OFC/NFOE March 6- LASER Wo March 1
MAR Ad Closing: Jan 25 Materials: Feb 1	Laser-Proof Coatings Microscopy Single-Photon Detectors Particle Analysis	**Space & Ground Telescopes** **Expert Briefing Webinar:** State of the Industry	Imaging Components & Systems	**Photonics Showcase** Ad Closing: Jan 31 Materials: Feb 7	PITTCON 2 AUTOMAT Interlech's March 2 OSA's Opt April 4-6 Photonix E April 13-
APR Ad Closing: Feb 25 Materials: Mar 1	Attosecond Lasers Polymer Optics Infrared Imaging Active-Matrix OLEDs	**3-D Displays** **Sneak Preview:** SPIE Defense, Security & Sensing 2011 **Sneak Preview:** CLEO Expo 2011	Optics & Optics Fabrication		Focus on M April 17-2 Optronics V April 20-2 SPIE Defen April 25-2 CREOL Ind April 29 - Interlech's April TBD CLEO Expo
MAY Ad Closing: Mar 25 Materials: Apr 1	Laser Alignment Optical Lithography Ultrafast Imaging Displays	**Q-Switched Lasers** **Sneak Preview:** LASER World of Photonics 2011	Lasers, Laser Accessories & Light Sources	**EuroPhotonics** Ad Closing: Mar 25 Materials: Apr 1 **Photonics Showcase** Ad Closing: Mar 31 Materials: Apr 7	SPIE Optic 9th EMVA May 13-1 SME's EAS May 17-1 SID 2011, SPIE/OSA Optics 20 SPIE Optic May 22-2 LASER Wo May 23-2 SENSOR & euroLED 2
JUNE Ad Closing: Apr 25 Materials: May 2	Nano-Lasers Optical Design Software Hyperspectral Imaging Optofluidics	**Plasmonics** **Expert Briefing Webinar:** Optics	Imaging Components & Systems		OSA's Adv June 12- Nanotech 2011, June 13-16 – Boston

Note: Shows and topics for all publications are subject to change.

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	Features	Digital Exclusives	Advertising Spotlight	Supplements	Bonus Trade Show Distribution
JULY Ad Closing: May 25 Materials: June 1	Fiber Lasers vs. Disk Lasers Optical Filters High-Content Imaging (Speed & Quality) Beam Profiling	**Spherical Optics**	Optics & Optics Fabrication	**Photonics Showcase** Ad Closing: May 31 Materials: June 7	OSA's Imaging and Applied Optics Congress July 10-14 – Toronto SEMICON West / InterSolar N July 12-14 – San Francisco OSA's Nonlinear Optics 2011, July 16-21 – Kauai, Hawaii NIWeek 2011, August 2-4 – A Microscopy & Microanalysis August 7-11 – Nashville, TN
AUG Ad Closing: June 24 Materials: July 1	Silicon Lasers Transformational Optics Organic Photodetectors Fluorescence AsiaPhotonics Photonics List Issue	**High-Powered Diode Lasers** **Sneak Preview:** SPIE Optics & Photonics 2011	Lasers, Laser Accessories & Light Sources		SPIE Optics & Photonics 201 August 21-25 – San Diego China International Optoelec Exposition (CIOE) 2011, September 5-8 – Shenzhen
SEPT Ad Closing: July 25 Materials: Aug 1	New Uses for Older Lasers (CO_2, etc.) Optical Materials, Part I Spectroscopy Metamaterials	**Broadband Spectroscopy** **Expert Briefing Webinar:** Lasers	Imaging Components & Systems	**Photonics Showcase** Ad Closing: July 29 Materials: Aug 5	SPIE 2011 Annual Symposi September 12-14 – Santa C FACSS 2011, October 2-6 – S
OCT Ad Closing: Aug 25 Materials: Sept 1	Green-Emitting Lasers Optical Materials, Part II Machine Vision Quantum Dot LEDs	**Laser Welding**	Optics & Optics Fabrication	**EuroPhotonics** Ad Closing: Aug 25 Materials: Sept 1	OSA Frontiers in Optics 201 October 16-20 – San Jose Interlech's LEDs 2011, October 24-26 – San Diego ICALEO 2011, October 2 OPTO 2 2011, October TBD – Photonex 2011, November 2 VISION 2011, November 8-1
NOV Ad Closing: Sept 26 Materials: Oct 3	Extreme Ultraviolet Lasers Aspheric Optics Software for Imaging Applications Test & Measurement	**Wavefront Optics** **Sneak Preview:** Society for Neuroscience 2011	Lasers, Laser Accessories & Light Sources	**Photonics Showcase** Ad Closing: Sept 30 Materials: Oct 7	SME's FABTECH 2011, November 15-16 – Chicago Interlech's OLEDs World Sum November TBD – City TBD
DEC Ad Closing: Oct 25 Materials: Nov 1	Quantum Cascade Lasers Optical Components Terahertz Imaging Nanophotonics	**Photonics in Sci-Fi** **Sneak Preview:** SPIE Photonics West 2012 **Expert Briefing Webinar:** Imaging	Imaging Components & Systems		

Note: Shows and topics for all publications are subject to change.

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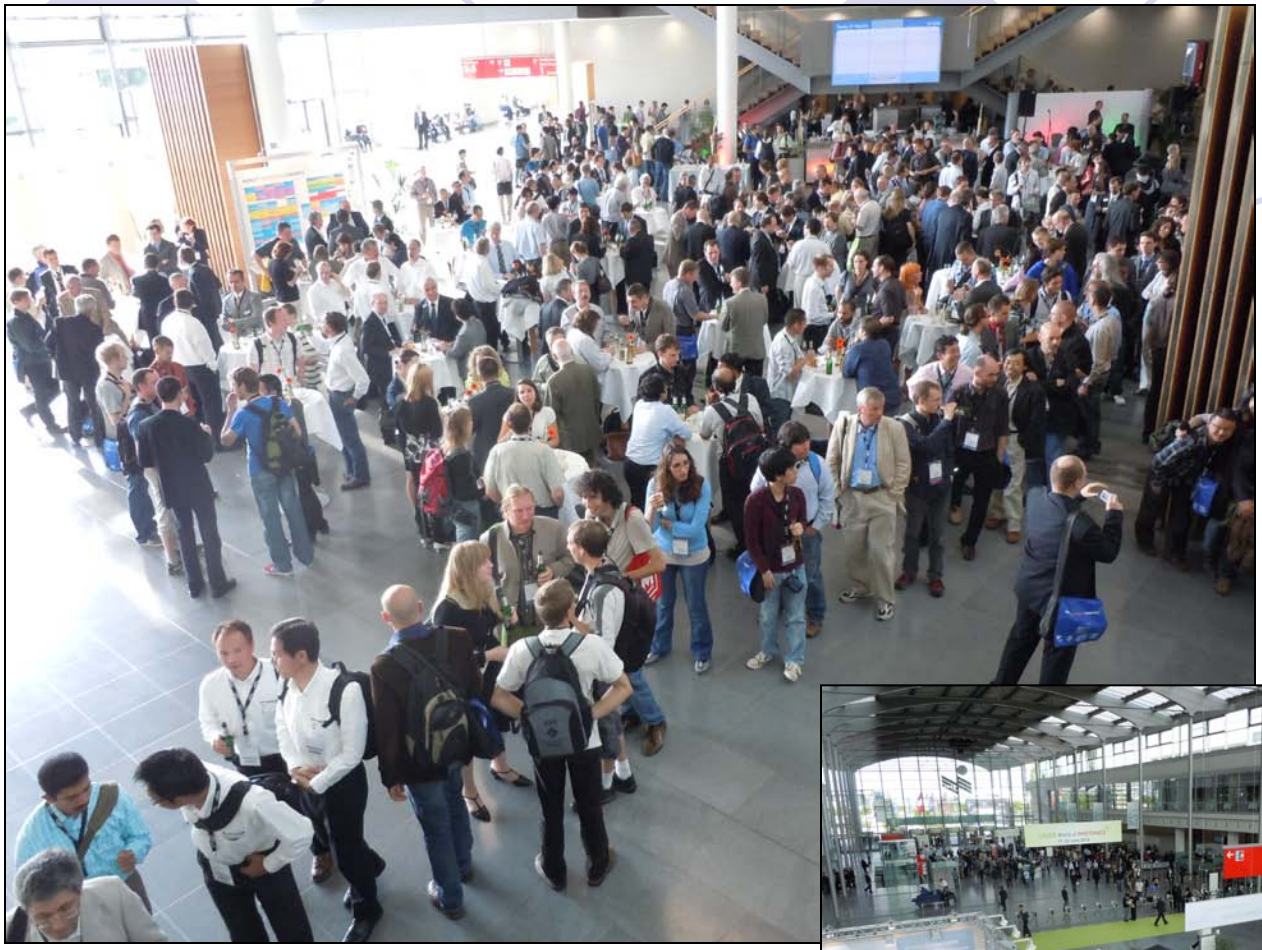


experts are everywhere

story development

- topic selection
- research: literature, online searches
- interviews with experts
- other sources
- writing
- editing (and re-editing)

Ultrahigh-speed OCT imaging enables 3-D volumetric data sets to be acquired. Images of the anterior eye (shown here) enable measurement of refractive parameters of the eye. Courtesy of MIT.

Ophthalmic Lasers Expand from Surgery to **Detection and Diagnosis**

BY MARIE FREEBODY, CONTRIBUTING EDITOR

Lasers are an established surgical tool in an ophthalmologist's armory against glaucoma, cataracts and macular degeneration, but developments in OCT will have doctors turning to lasers before the patient ever reaches the operating room.

The development of lasik surgery has led to a rapid growth in the vision correction market over the past two decades. But lasers are now starting to find a place in the early detection and diagnosis of certain eye conditions, particularly when used in optical coherence tomography systems.

The first application of femtosecond lasers in ophthalmology was for lasik refractive surgery procedures, in which incredibly short pulses (around 700 fs) give surgeons the accuracy and predictability necessary for delicate tissue vaporization.

During a procedure, a femtosecond laser is used to create the corneal flap, approximately 150 µm thick, which is lifted prior to application of an excimer laser that remodels the shape of the cornea.

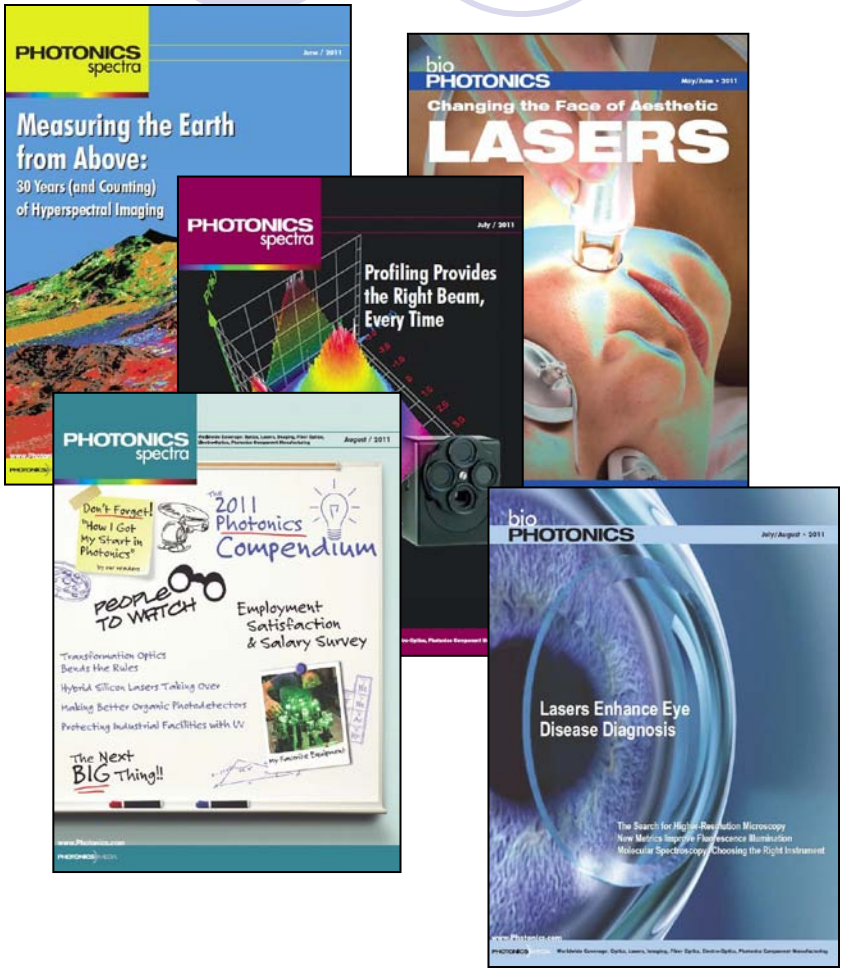
According to Graham Cox, a professional services manager at Ultralase, one of the leading refractive surgery providers in the UK and Ireland, the femtosecond laser creates corneal flaps, which are thinner and planar (of even thickness) compared with manual incisions. What's more, the complication rate is greatly reduced, from around 1 in 300 using a traditional bladed microkeratome, to 1 in 2500 using a laser.

There are six companies that manufacture and sell femtosecond lasers for ophthalmology: Abbott Medical Optics of Santa Ana, Calif., which acquired IntraLase in 2008; Ziemer Ophthalmic of Port, Switzerland, which produces the FemtoLDV femtosecond laser; Carl Zeiss Meditec of Jena, Germany, which offers the VisuMax laser; Technolas Perfect Vision of Munich, Germany, which offers the Technolas Femtosecond Workstation; Alcon Laboratories of Fort Worth, Texas, which acquired LenSx Lasers in 2010; and LensAR of Winter Park, Fla., which sells the LensAR Laser System.

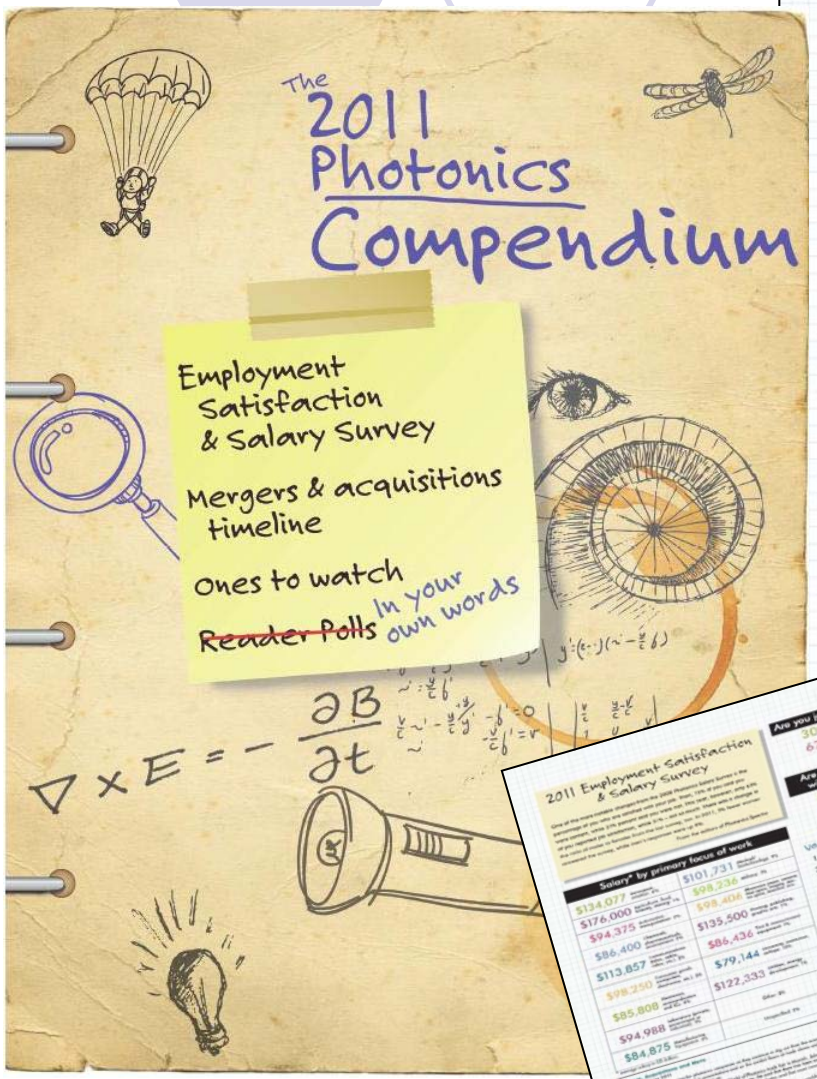
article assembly

- lede sentence
- background
- details
- what's next

delivering the news



august issue



In Your Own Words

Our salary survey has a lot of facts and figures for you to digest, but we also wanted to find out some personal tidbits from various corners of our industry. What inspired people to get involved in photonics? What are their favorite instruments? And what will be the next big thing over the next five years or so?

To find out, we launched a social media campaign, polling users on Twitter, Facebook and LinkedIn. Read on to see what your peers had to say ... and you might even find your own responses below.

Laura S. Marshall
laura.marshall@photonics.com

Q: *Think back to a time when you decided to pursue photonics as a career. Can you identify a single technology or concept that got you hooked?*

LinkedIn

Glenn Fishbine: Well ... I was at a high-end department store looking for a wedding present and picked up a Mikasa wine glass with a black stem and noticed I could see a high-contrast image of my fingerprint. I was amazed. Didn't know why it worked. So, a few years later, I started a biometrics fingerprint company, which produced the first widely accepted forensic-grade fingerprint-capture technologies for law enforcement.

Sunny Bai

free choice of project in a science/physics class, it was optics all the way.

James Hauck: I thought lasers were neat and tried to build a dye laser; that did not work, but I was not discouraged and built many more lasers and other optical systems.

Dennis Hancock: It was the mathematics performed by optical signal processing that was the gateway toward a future of things optical – instrumentation, metrology, simulation, repairing the Hubble Telescope, assisting with DNA sequencing. Wish it could continue.

John Pe

Ian Kohl: Short-pulse lasers. Nothing like seeing the nonlinear effects that happen at such a high intensity.

Paul Constantinou: For me, I was introduced/helped into this field by two profs at my undergrad university: an astronomy prof I worked for during summers and a theoretical particle physicist who I took a number of courses with. To say that there is a broad separation between particle physics and astronomy is somewhat of an understatement – the scale differences between subatomic systems and galactic systems are about as large of a difference as you can get in nature, and I had no idea where in this vast range I wanted to focus my studies!

One day, I was passing by the office of the astronomy prof, and he pulled me in and told me he thought it would be great if I exposed myself to this "new" field of photonics. There was an industry-student retreat sponsored by the old PRO (Photonics Research Ontario) that had some spaces available, so I checked it out with a few classmates and had a great time.

A year or so later, when I was looking at grad school options, the particle physics

Mary Lou Jepsen: For me, it was the lenticular on the cover of my "Thumbelina" book I had as a little girl. I scratched to try to get inside the 3-D picture; to find that it disappeared was a mystery at age 3. I then started to study why, and it's hooked me for decades.

have the drive that was first kindled by that simple presentation.

AUGUST 2010

PerkinElmer Inc. of Waltham, Mass., acquired **VisEn Medical Inc.** of Bedford, Mass.

GT Solar International Inc. of Merrimack, N.H., acquired **Crystal Systems Inc.** of Salem, Mass.

Veeco Instruments Inc. of Plainview, N.Y., sold its metrology business to **Bruker Corp.** of Billerica, Mass.

Corning Inc. of Corning, N.Y., acquired **Plaslab SAS** of Borre, France.

got news? contact us!

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thank you