FEATURES

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Questions and Answers
WITH THE IUVA PRESIDENT
Paul Swaim

1. What has been your vision for IUVA? During the time that you served, what part of this platform do you feel has been achieved?

My vision for the IUVA has been to work with the Board, EOC, Executive Director, and Hub Directors to set the foundation for IUVA to remain a sustainable, relevant organization for the long term. While the initial interest and excitement over UV applications for drinking water began to subside to some extent, UV technology has a long, “bright” future as a key technology to benefit public health and the environment.

That means that my focus has been first to get IUVA squarely in the spotlight in terms of relevancy. Due to a number of factors, IUVA had been less active before my presidency began, and in the last two years, we’ve focused on holding events that appeal to our current and prospective members including webcasts, workshops and regional conferences. We’ve had several successful events and have more planned in the next six months.

We have also been busy institutionalizing best practices for running our organization. Executive Director Martinez has brought invaluable experience in this area, and our team has done some catch-up on past practices and laid the groundwork for the future together.

2. How long have you been a member of IUVA?

I joined the IUVA in the first few years of the organization. Two people who were mentors to me, Jim Malley and Jamal Awad, encouraged my membership and helped me understand the organization and become an active participant. In the early 2000s, I got involved by speaking at workshops in several locations and attending World Congresses. I looked to the IUVA as the center of technology-transfer related to UV disinfection.

3. What do you see coming on the horizon for UV professionals and companies for the next 10 years?

The shiny wrapping paper is off of UV technology in my field of water and wastewater engineering, but at the same time UV is now a readily accepted technology for disinfection and advanced oxidation. That’s exciting because we have so many water challenges ahead of us in terms of scarcity, climate change and sustainability, and we can spend our energy implementing projects that include UV rather than making the case for why UV should be included and how it should be considered. My career is focused on water, but the opportunities in air treatment, ballast water and other markets are equally exciting.

4. With reference to an increase in STEM education programs, do you feel this will have a direct impact on U.S. citizens and technology industries in the United States? If so, how soon will this come about?

STEM education is critical to education in our country. My company, CH2M HILL, has made it a focus area for contribution, and we need to build talent in the fields of science and engineering to develop the technical talent we need to solve the issues in front of us. My son attends a 6th grade at a STEM school, and it has made a lot of positive difference for him. It’s great to see the focus on STEM education, and I hope to see it really make a difference before long.

5. How will STEM education initiatives affect the economy?

Positively!

6. Do you feel there are also pressing global issues on the topic of UV education at the secondary and college level?

I think UV technology and education should be part of curricula when it’s applicable. Our leading professors in the field of environmental engineering are members of the IUVA and are already leading the charge.
7. As you reflect upon the time you served as president, what sort of outcomes do you envision for IUVA?

I’m proud of what we’ve accomplished in my two years as President of the IUVA. It’s great to be able to contribute as a volunteer to such an important organization. I’m always proud of the IUVA when I describe our mission and vision to audiences. It’s been a great experience for me, and I’m thankful to CH2M HILL for their support! My family has been there supporting me as well. I really think we’ve laid the foundation for continued success. I know I sleep well at night knowing Professor Karl Linden will serve as the next IUVA President. Our challenges are to continue to educate and to increase our relevancy across the spectrum of UV technologies.

8. How long have you studied UV technology? What first piqued your interest about becoming involved with UV Technology?

I first became aware of UV technology in 1991. Fresh out of graduate school, I had the great opportunity to work on a wastewater disinfection project for the Central Contra Costa Sanitary District. I worked with a number of great engineers, many of whom I still see regularly. I learned about UV and was fortunate to work on a large and groundbreaking project to implement UV disinfection at a WWTP. The project replaced gaseous chlorine being delivered by railcar, and my friends from school were jealous that my work was doing something that was tangible and good for the environment and community.

9. Summarize your thoughts about the current UV industry and your role within it.

My focus area is the practical application of UV technology on water, reuse and wastewater projects. I’ve encountered a great group of people at all levels and from every sector of our business on my projects and in my time with the IUVA. I’ve been fortunate to contribute to a lot of UV projects across the world, thanks to CH2M HILL’s good reputation and good work. The people I’ve come across are all looking to improve water quality, and in so doing, public health and the environment. With these as our objectives, the future is bright!
A Message

FROM THE IUVA EXECUTIVE DIRECTOR

Deb Martinez

Spring is in the air, and this season brings us a rejuvenated spirit and a renewed commitment to pressing ahead with an aggressive agenda to promote IUVA as world-recognized brand valued for its leadership, information and education on all topics related to the ultraviolet industry. IUVA is building momentum with growth in membership and activities that serve those members, and we plan to maintain and build that momentum.

In the months to come, we are looking forward to an important conference in Germany and, of course, the World Congress in Las Vegas. The EMEA Hub division of the IUVA is partnering with TZW: DVGW-Technologiezentrum Wasser to produce a UV conference in Karlsruhe, Germany, June 4-5, 2013. For more information http://iuva.org/event/karlsruhe-germany.

IUVA will collaborate with the International Ozone Association (IOA) for the third bi-annual World Congress, in Las Vegas, Nevada, September 22-25, 2013. If you haven’t already, please make plans and register to attend. Note also that sponsorship opportunities are still available.

These events are attended by industry leaders, scientists, engineers, students and the public. They present great opportunities for professional development and networking.

In fact, IUVA is increasing its efforts to get more involved in the area of continuing education and certification. It is exploring a number of opportunities in the context of a growing awareness nationally and internationally that the demand for education, training and certification are increasing dramatically for engineering and technology professionals at all levels. As IUVA develops a leadership position in these activities as they pertain to ultraviolet technology, this will further enhance the brand of IUVA and the awareness of how ultraviolet technology can make the world we live in cleaner and safer.

On a personal note, I am happy to report that I was named one of the Top 25 Women in Higher Education by Diverse Issues in Higher Education Magazine in its March 14, 2013, edition. The Top 25 Women in Higher Education included several university presidents and executives of educational organizations and associations. Diverse Issues in Higher Education described its Top 25 Women issue as “a salute to women who have made significant contributions in higher education from administration, science, nonprofit organizations and sports.

On behalf of the IUVA leadership and members, I welcome everyone to participate, learn and envision the future of UV technology with us.

Best wishes, and thanks for all your support.

All best wishes,

Deb Martinez
Executive Director
Questions and Answers

WITH THE DIRECTOR OF THE IUVA EUROPE AND MIDDLE EAST (EMEA) HUB

Andreas Kolch

1. How did IUVA become involved with the German Water Center? Why did they choose to co-sponsor a conference in Karlsruhe, Germany in particular?

The Water Technology Center operates the only UV disinfection test facility for drinking water in Germany. These tests are the basis for approval according to DVGW W294 – one of the most prominent tests protocols for drinking water systems, not only in Germany. In Germany, however, this approval is necessary to get the allowance for the use of a particular UV system in drinking water. Besides this the Technology Center is involved with research and further standardization projects with respect to UV technology used for the disinfection of drinking water. As such it was only natural for IUVA and the Technology Center to get in touch and talk about a joined event.

2. What are some of the current trends in Europe regarding UV water and wastewater treatment, and advanced oxidation that will be featured at this conference?

Wastewater disinfection and AOP are not as popular as in the U.S. or other countries. However AOP is increasingly used for the treatment of surface water to eliminate pesticides or algae born substances in Europe. At the conference we will hear about this – but also about news in the drinking water application arena and commercial applications as well.

3. Currently, compared to the United States, what is the thinking about UV technologies and water and wastewater treatment in Europe? Is UV being implemented on a more mass scale in Europe or the U.S.?

Just spontaneously and as my best guess I would say that the percentage of water treated per person could be similar in the U.S. and in Europe. One needs to define what mass scale means though. For sure, larger systems are installed in the U.S. both for waste water and drinking water.

4. You spent 2005-2007 as president of IUVA. Since that time, what has changed? Have there been significant accomplishments by scientists and engineers in this industry?

The point I want to make here is that with water technologies there is always the question about significant improvements. Actually, what matters and what is important are all the little improvements over time. There are far to many to list or to single out one thing or another. I always compare water technologies with cars. Cars look similar to the cars in 2005, and they aren’t flying or burn water instead of fuel. However, everyone would agree that one can buy a better car today than in 2005.

5. When did you first become involved in the study and application of UV water and wastewater treatment technologies?

In 1989 when I was a student, I got involved with a research project for my diploma thesis about the use of UV for drinking water in Germany. Actually the topic was about the influence of various UV reflective materials on the efficiency of the disinfection process – something which has been taken up several times over the years by some companies.

6. Express your thoughts on UV LEDs and how this will impact water purification.

To answer this question, one has to be a bit speculative. However, I am sure that UV LED will impact the market strongly and perhaps in a shorter time line than most people currently think. I know there is a lot of skepticism – but that was the same for more or less everything we are used to today from trains to digital photography.
Imagine trying to cost-effectively replicate the conditions of an intensive care unit at 17,500 feet elevation on the world’s largest mountain. This is exactly what the team of Xtreme Everest 2 recently accomplished. On March 10, their laboratory, operating room and patient areas installed Cardinal LED lighting from RedBird LED, a leading manufacturer of LED Linear Replacement Lamps. Xtreme Everest 2 is a dedicated team of intensive care doctors, nurses and scientists that are studying health problems in hospital intensive care units.

The Xtreme Everest 2 location at Mount Everest High Base Camp required rugged, energy-efficient lighting that could perform well in extremely cold temperatures. The solution: RedBird Cardinal Vapor tight LED Luminaires, PG3-66W-50K-132. They provide one of the highest lumens/dollar and lumens/watt of any LED lighting fixture. The Cardinal LED tubes are a direct mechanical fit into standard fixtures, operating on any voltage ranging from 110 to 277 VAC, and do not require the fluorescent ballast. Cardinal LED Tube lights deliver 7,000 lumens of light, yet only draw 66 watts.

Jonathan Eppstein, RedBird’s President says, “We’re pleased to have been selected to light this important facility. The research being done by this dedicated team will have a huge impact on treating a wide array of medical conditions. Our LED lights, with their high CRI and low-energy use fit the bill perfectly for this application. While we in the U.S. may think our energy rates are high, just imagine what the cost of electricity is at Everest High Base Camp, where generators running on gasoline flown in by helicopter provide all the power. “

Cardinal LED Linear products are UL listed as both a Luminair-Conversion-Retrofit-Product and as a Recognized Component Product ensuring that when installed as directed all UL compliance for the fixture is preserved. Installed efficacy (the ratio of light-output to power consumed when installed in real world fixtures) has been measured at 110 lumens/watt, one of the most energy efficient LED lighting products available today.

Cardinal Linear Lights have been qualified by the DesignLights Consortium (DLC) making them eligible for many utility rebate program in the U.S. and Canada. RedBird Cardinal LED Tube Light was awarded the 2012 Progress Report Selection by the Illuminating Engineering Society. For more information, visit http://www.redbirdled.com.
Linden Receives Pioneer Award for UV Light Research

University of Colorado Boulder Professor Karl Linden, Ph.D., has been named the recipient of the William W. Edgar Pioneer Award in Disinfection and Public Health from the Water Environment Federation’s Disinfection & Public Health Committee. The award is for Dr. Linden’s research on ultraviolet light disinfection systems. Dr. Linden is President-elect of IUVA.

Dr. Linden’s research specifically examines innovative UV light-based systems that can be used to treat drinking water and wastewater by destroying harmful pathogens and contaminants. Chlorine has traditionally been used as a water disinfectant, Dr. Linden says, but there are many challenges that come with using this chemical. Not only can handling chlorine be hazardous but it also forms certain byproducts that are unhealthy for people to ingest and is ineffective against a range of pathogens. UV light, however, does not use any chemicals, is effective against many chlorine resistant pathogens, and is safer to handle.

“UV light has been an emerging technology for a number of years, and it’s really come onto the water treatment scene to where it is seen as a standard solution,” Dr. Linden says. “Much of my research has helped to bring it forward to the point that it’s acceptable for public health officials, regulators and water utilities to use UV light and be confident in its capabilities.”

In the past, there were concerns on how to effectively measure UV light and detect whether enough UV was introduced into the system to ensure disinfection, but Dr. Linden’s research has helped solve many of those problems. In fact, he and the 50 graduate and undergraduate students he has mentored have made advances regarding UV disinfection fundamentals, UV light measurement techniques, sensor development and testing, and reactor validation testing, says Dr. Linden, who has been researching UV light technology since the mid-1990s. With these advances, a water utility can implement a UV system and feel confident in its ability to provide safe, clean water.

The William W. Edgar Pioneer Award recognizes researchers who examine emerging disinfection research, biosolids technologies in disease control and process modeling to improve disinfection practices. Dr. Linden received this award while attending the Disinfection & Public Health Conference 2013.
Novotel Saigon Centre Chooses Hanovia UV Technology

Novotel’s flagship Saigon Centre hotel in Ho Chi Minh City, Vietnam, has recently installed six Hanovia UV systems for service water treatment. The UV systems kill any microorganisms from the incoming city water supply, leaving it good enough to drink. All the UV systems provide a minimum 99.999 percent reduction in E.coli, Cryptosporidium, Giardia, Legionella and other harmful microorganisms.

Tourism is a flourishing industry in Vietnam, with over a third of all visitors coming from Europe, where water quality is taken for granted. Currently, only 22 percent of hotel guests are Vietnamese, with 34 percent from Europe, 8.6 percent from North America and 9.5 percent from Oceania. Having water of a drinking quality standard is therefore a high priority for the leading hotel chains operating in Vietnam.

“Hotels across the Asia-Pacific region are now taking extra precautions to ensure their water meets the World Health Organization’s drinking water quality guidelines and to ensure their guests’ health and safety,” commented Hanovia’s Asia Pacific Manager Ying Xu.

Even though hotel tap water is not intended for drinking purposes, UV provides that extra level of health and safety for residents in case they inadvertently drink the water, such as while brushing their teeth, or inhale water aerosol while showering. UV is in fact the WHO’s recommended disinfection method for Cryptosporidium and Giardia removal. It is already widely used to remove both microorganisms from water supplies in the European Union and United States. Water standards in Vietnam do not include Cryptosporidium and Giardia, but the Novotel chain sees the importance in conforming to the WHO’s standards,” she concluded.

Traditionally, hotel water in Vietnam has been treated with chlorine. While this kills most microorganisms, it is ineffective against Cryptosporidium and Giardia, both of which are extremely hazardous to human health, causing severe diarrhea, vomiting and fever, which can last for a month or more. Water treatment experts were unaware of the limitations of traditional chlorine disinfection until recent years. Chlorination can also affect the taste and smell of water if doses are too high.

In this installation, six, single-lamp AF3 amalgam UV systems are installed on the hotel’s roof, treating water flows between 26.5 m3/h and 30 m3/h. City water passes through sand filters before storage in roof tanks, and then it passes through the UV systems prior to distribution to every room in the hotel. These UV systems are very small and can be installed in the tightest of places.

A major advantage of using UV is its low operational cost. For example, 166 m3/hr of water is treated at the hotel. As the six UV systems only consume 1.62 kW of power between them, for every 1 m3 of treated water, the UV system consumes less than 0.01 kWh of power, which is approximately 0.1 US cents per m3.

Commenting on the installation, Hanovia’s Managing Director John Ryan said: “This is yet another successful hotel project and reinforces our expertise as suppliers of UV technology that can be used across the board: from potable-standard water in hotel rooms to chloramine-free water in hotel pools and spas.”

Based in the United Kingdom, with a worldwide distributor network, Hanovia is a world leader in UV disinfection technology for the leisure and hospital-
ity industries, with hundreds of successful installations across the globe. With over 85 years’ experience in the design, development, manufacture and distribution of UV systems worldwide, Hanovia has been supplying systems for pool water treatment since 1993. Hanovia is a subsidiary of Halma plc.

Neotech Aqua Solutions and Bluewater Bio International Sign Agreement

Neotech Aqua Solutions, Inc., the industry leader in high-efficiency ultraviolet (UV) water treatment systems, announces its first exclusivity agreement, signed with Bluewater Bio International, a leading global provider of innovative, high-performance water and wastewater treatment technologies.

The agreement, effective March 5, 2013, grants Bluewater Bio exclusive sales rights for NeoTech Aqua’s patented UV technology in England, Wales, Scotland, Northern Ireland and the Republic of Ireland. Further, non-exclusive sales and marketing rights extend beyond the UK/Ireland markets. Bluewater Bio is headquartered in London, has offices in the Middle East and South Africa, and has partners in Russia, Spain, India, China and the U.S.

“The NeoTech Aqua Solutions team welcomes the opportunity to move forward in cooperation with Bluewater Bio,” says Stephen Dunham, NeoTech’s President/CEO. “The synergistic advantages of leveraging Bluewater Bio’s existing technology, global footprint and strategic relationships with NeoTech’s unique technological strengths in UV render a new multi-faceted capability that will benefit both companies and particularly the market at large. This is an exciting time of expansion for our respective technologies.”

Daniel Ishag, Founder and CEO of Bluewater Bio adds, “I would like to take this opportunity to thank both teams for their effort in bringing this deal to fruition. As Bluewater Bio looks to increase our technology portfolio and service the needs of our growing customer base, this NeoTech Aqua Solutions deal signifies an important step in realizing that aim. Bluewater Bio aspires to be the world’s leading independent water technology provider, and I strongly believe, with technology like NeoTech Aqua’s, we are on course to achieve this.”
SETi Launches a New Line of Surface Mount Devices for High-Volume Cost Sensitive Markets

Sensor Electronic Technology, Inc., (SETi) has launched a new line of UVTOP® products in surface mount packages at the 2013 SPIE Photonics West show. Initial devices added to this product line will operate with peak operating wavelengths at 275nm and 310nm respectively. Additional wavelength specifications will be added to the product line in the near future.

This SMD-based line of UVTOP® LEDs has been developed to address high volume markets that demand lower device and assembly costs.

The ceramic package dimensions are 3.5mm x 3.5mm and are available with UV stable encapsulation, a flat glass window, or a hemispherical glass window. Windowless devices are also available.

The entire range of UVTOP® LEDs will remain available in TO packages for lower volume requirements, customized specifications and for customers who prefer a through-hole package.

In 2012, SETi opened its high volume manufacturing facility for UV LEDs, driving the cost of manufacture down. Now by employing new high-volume packaging techniques and with the use of a cost effective ceramic package, SETi is bringing the world leading UVTOP® LEDs to new mass-volume markets where the TO package is not the most effective solution.

For more information and for technical specifications, please contact SETi at info@s-et.com or +1 (803) 647-9757.

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There was a closed vessel unit that was single ended, resulting in a smaller footprint, and full access for maintenance?

There Is!

Introducing InLine+SE

Aleddra LED Lighting, a business unit of Lightel Technologies, Inc., recently announced that its LightFly 5000 LED Balloon luminaire is now available in the U.S. as an energy-efficient solution for construction area lighting.

The new LightFly 5000 LED Balloon Light offers 360-degree lighting at 97.5 LPW, making it the ideal choice for any work area lighting application, indoor or outdoor. The translucent balloon cover reduces glare that is associated with harsh HID lighting alternatives. The luminaire’s pleasant soft white light helps create a safer workspace for workers.

Lumen output level is controlled with a toggle switch for changing lumen output between 11,700 and 23,400 lumens, depending on the application needs. At 23,400 lumens it consumes only 240W as compared to the standard HID lamps using 1000W at 20000 lms. For more information, visit www.aleddra.com.
Heraeus Air Quality Monitoring at London Heathrow Airport

Air pollution such as ozone, nitrogen dioxide, volatile organic compounds (VOCs) and fine particulates - mostly from vehicular emissions - puts a strain on the environment and affects people’s health, which could result in reduced life expectancy. Real-time monitoring of air quality is important to understand the factors that influence air pollution.

“Ultimately this could lead to understanding the links between pollution events and their impact on human health” said Prof. Rod Jones, Dept of Chemistry, University of Cambridge and Principal Investigator on the SNAQ at LHR Project.

Heraeus Noblelight, a leading manufacturer of specialty light sources, supplies photoionization detector lamps (PID lamps) used in the SNAQ sensors.

Air Analysis & Pollution Control with PID Lamps

Measurement of Volatile Organic Compounds (VOCs) using portable Photoionisation Detectors (PID) enables fast detection at ppb sensitivity.

Monitoring VOCs using PID is becoming an economical way to track pollution and air quality in urban environments. Heraeus PID lamps are the industry-leaders for lifetime and spectral purity for cost-effective, reproducible analysis.

Photoionization is the term for the absorption of high-energy photons by a molecule, which results in ionization of that molecule. The current created by ionization is proportional to the concentration of the molecule, so this provides a simple method for quantitative analysis of a variety of compounds.

The technique is non-destructive so can be used in conjunction with other detectors for extending the analysis. Photons will only ionize molecules with an ionization potential less than the photon energy.

Heraeus manufactures a range of PID lamps with varying photon energies to enable a degree of compound selection. A recent introduction has been a dedicated 10.0 eV lamp, which is particularly useful for measuring BTEX compounds.

The objective is to discover new insights in dynamic levels of airborne pollution and demonstrate the potential of the sensor network for characterising air quality in the urban environment.

The project has been funded by the British Natural Environment Research Council (NERC) and runs from 2011-2013.

The Network of Sensors

A new system of instruments is currently being tested in and around London Heathrow airport: the Sensor Network for Air Quality (SNAQ) with 50 stations has been installed measuring the air pollution caused by road and air traffic around Heathrow airport.

The small battery-powered instruments are lamppost-mounted and contain a number of sensors that measure six gases, volatile organic compounds (VOCs) and airborne particulates. The system works wirelessly – data transmission is via GPS and GPRS to a central server.

Heraeus has extensively tested and selected materials to establish a quality standard in PID manufacture. Heraeus’ proprietary manufacturing processes ensure unparalleled performance and consistency over the lifetime of the lamps. The use of pure crystal MgF2 windows produces improved transmission and lifetime. High purity of the gas spectrum is achieved throughout the life of the lamp.
by the use of a Heraeus-design internal cleanser.

Heraeus manufactures a wide range of PID lamps to standard and customer specific designs in both RF and DC versions. For hand-held detectors, RF versions provide the best solution due to demands for smaller size and low power drive circuitry, whereas DC operation is the preferred option for laboratory instruments. Customers can also benefit from Heraeus’ design expertise, as the Heraeus Technical Team can work with OEMs to design and build the product to their specific dimensional and performance requirements.

Heraeus Photoionization Lamps (PID lamps) used in sensor network measure volatile organic compounds (VOCs)

Heraeus Noblelight GmbH with its headquarters in Hanau, Germany, and with subsidiaries in the USA, Great Britain, France, China and Australia, is one of the technology- and market-leaders in the production of specialist light sources.

Heraeus, the precious metals and technology group headquartered in Hanau, Germany, is a global, private company with more than 160 years of tradition.
Early next month, researchers from the University of Colorado Boulder will begin the painstaking process of interviewing hundreds of undergraduates in an effort to understand why the rates of students switching out of science, technology, engineering and math majors has remained troublingly high over the last couple of decades despite widespread efforts to address the problem.

The five-year, $4.3 million project, undertaken in partnership with the University of Wisconsin-Madison, replicates and expands on a study begun by a couple of CU-Boulder researchers two decades ago and published in 1997 as a book. “Talking About Leaving: Why Undergraduates Leave the Sciences” has since become a seminal text in the field of STEM education.

“Part of the reason why we’re undertaking this study is that the rates of students switching out of STEM majors has remained so persistent,” said Anne-Barrie Hunter, co-director of ethnography and evaluation Research at CU-Boulder and principal investigator for the Colorado research team. “Here we are now, 20 years on, and the rates are still roughly the same. They’re very, very stubborn.”

The study, which is being funded by the National Science Foundation and the Alfred P. Sloan Foundation, is the first to be run out of CU-Boulder’s new Center for STEM Learning.

When the original study began in the early 1990s, the high rates of students leaving STEM majors — between 40 and 60 percent, depending on the discipline — were known, but the reasons for the switching were just conjecture. Some thought that the students who switched didn’t have the necessary ability to succeed in tough science classes, while others blamed teaching assistants with difficult-to-understand accents or the lack of experience of teaching assistants in general.

CU-Boulder researchers Nancy Hewitt and Elaine Seymour set out to determine whether any of the speculation was true by asking those who should know: the students.

The pair led a research team that interviewed more than 400 undergraduates, both “switchers” and “persisters.”

“Our evidence didn’t support what they thought,” said Seymour, who is also involved with the new study. “We were really surprised.” As it turned out, “switchers” and “persisters” were equally bright and teaching assistants were often a much-needed lifeline for struggling students. In fact, both sets of students faced the same set of challenges, the largest of which was the way science classes were taught.

“What we discovered was that an incoming interest in the sciences was dissipated over the course of the first two years by the way the courses were taught,” Seymour said. “The teaching in those days was predominantly stand-and-deliver lecturing.”

Since Seymour and Hewitt’s book was published, there has been a nationwide effort to improve the quality of...
undergraduate science education. “Change is going on all across the country,” Seymour said. “But it may not be sufficient to move the needle.”

For “Talking About Leaving Revisited,” the researchers will interview undergraduates at the seven institutions that hosted the original study to find out if the reasons for switching have changed. But the new study will also go further by interviewing course instructors, observing classroom teaching practices and analyzing the transcripts of students across institutions to look for patterns among switchers and persisters. When the study is concluded, the research team plans to publish another book.

Talking About Leaving Revisited is one of the inaugural grants affiliated with CU-Boulder’s Center for STEM Learning, which was officially formed in December. The center, which was organized over four years with the backing of a $1 million institutional transformation grant from the National Science Foundation, aims to provide an infrastructure that will support the more than 75 existing STEM education programs on campus and allow them to more easily collaborate.

“We will provide a network and support structure designed to catalyze and provide links among these people, ideas, tools and resources,” said physics Professor Noah Finkelstein, one of the people who helped lead the effort to create the new center.

The Center for STEM Learning, which will also strive to be a state, regional and national resource, has three main thrusts: to transform the way STEM classes are delivered, to support research into the best practices for STEM education, and to help recruit the brightest to become STEM teachers.

For more information on the study visit http://wceruw.org/projects/projects.php?project_num=956.

Hanovia Planning UV industry Seminar in Indonesia

UV disinfection specialist Hanovia Limited is hosting its second UV Industry seminar with ideas and practical advice on the use of UV in the food and beverage, pharmaceutical, pools and leisure and building services industries.

The seminar will held on April 11 at Hotel Mulia in Jakarta, Indonesia. It follows the enthusiastic response to the inaugural seminar held in Dubai last year.

The seminar will feature industry leaders and in-house Hanovia staff who will talk about how to make significant improvements in water disinfection processes by exploiting clean UV technology.

There will also be hands-on demonstrations of the latest UV systems and one-to-one consultations with specialists and representatives from PKMG, an Indonesian engineering firm that is a supplier of process water technology.

In particular, the seminar will discuss performance qualified (PQ) UV systems developed specifically for the food and beverage and pharmaceutical industries. Delegates will learn how these systems offer step-change improvements in process security and ensure better quality water in critical, high purity applications.

To learn more about the seminar agenda and access the registration form, visit: http://www.hanovia.com/indonesia-seminar-registration/#reg-form.

Hanovia Appoints New Technical Director

UV disinfection specialist Hanovia has appointed Mark Aston as its new Technical Director.

Mark has over 25 years’ experience in developing profitable products from innovative technology. He has held senior director roles in engineering companies operating in the electro-optical and bespoke engineering market sectors, including traditional and solid-state lighting technologies.

His role in Hanovia will be to implement new technology and product development programs as well as consolidate planning for continuous improvement of Hanovia’s unique range of UV treatment products.

Mark has a BSc (Hons) in Physics and Astrophysics, and a DSc in Optical Physics. He is also a Chartered Physicist and Honorary Research Fellow of University College, London.
NeoTech Aqua Solutions Sponsors Water for People San Diego Event

NeoTech Aqua Solutions, Inc., the industry leader in high-efficiency ultraviolet (UV) water treatment systems, was the title sponsorship of the San Diego Committee of Water for People’s Magic of Water for People Spring Mixer. The event, which was held April 24, featured CDM Smith engineer and former Peace Corps volunteer Randa Chichakli, who shared her experiences in mapping and recording conditions in Rwanda to identify districts and communities for future infrastructure improvements.

“We were excited to be the San Diego Water for People Committee’s Magic of Water for People Mixer title sponsor this year,” says Stephen Dunham, NeoTech’s President/CEO. “We believe in this organization’s mission of developing innovative and long-lasting solutions to the water, sanitation, and hygiene problems in the developing world. Water for People strives to continually improve, to experiment with promising new ideas, and to leverage resources, multiplying their impact on the world’s water problems.”

NeoTech Aqua Solutions specializes in the development, manufacturing and sales of high-efficiency UV systems for disinfection and TOC-reduction in water treatment plants. Since 2002, the company has secured multiple patents on UV technologies which reduce power consumption, space requirements and operational costs by up to 90 percent compared to standard UV systems.
The winners of the IDTechEx Energy Harvesting and Wireless Sensor Networks Awards were announced at the Fifth annual conference and exhibition in Berlin, Germany, April 17. The event was attended by over 300 people and was held in conjunction with six other IDTechEx events covering a range of emerging technologies.

The award winners were:

**Best Technical Development of Energy Harvesting**
The award was given to Sol Chip, for the development of their solar energy harvester with a power management solution, a complete device with a high level of integrations and a wide range of applications in many vertical markets.

**Best Application of Wireless Sensor Networks**
The award went to EnOcean GmbH for their deployment of over 20,000 devices in order to improve the energy efficiency of the Squaire Building, a building near Frankfurt Airport in Germany. The sheer size of the deployment is very impressive and goes hand-in-hand with the equally impressive energy savings achieved using EnOcean’s technology.

**Best Application of Wireless Sensor Networks**
This award was won by Libelium and their partner IDOM, for their novel application of a wireless sensor network solution in wine production. Deploying WSN in vineyards comes with many challenges, especially given the very traditional approach in this type of industry.

**Best Poster Award**
Finally, the best poster in the session was the contribution of Dr Daniel Lewandowski from Wroclaw University. Titled “Solid State Magnetic Phenomena and their Power Conditioners for Low Power Electronics”, the poster’s research findings focused on utilizing magnetostrictive phenomena to harvest energy for low power devices.

IDTechEx encourages entries for the next Energy Harvesting and WSN awards, which will be take place during the North American installment of the IDTechEx Energy Harvesting and WSN conference held in Santa Clara, Calif., November 20-12, 2013.
Asia’s Premier Lighting Industry Event, the Guangzhou International Lighting Exhibition, to be Held on June 9-12

The Guangzhou International Lighting Exhibition, Asia’s most comprehensive lighting industry platform, will be held June 9–12, 2013, at the China Import and Export Fair Complex in Guangzhou, China. The show will attract project-based buyers such as architects, interior designers, planners and engineers, building contractors, property developers, housing and property managers, construction and planning authorities and others that seek to find sources for a range of lighting applications and solutions.

Bringing together industry players from all aspects of lighting, the 2013 show has already confirmed more than 2,000 exhibitors from 26 countries and regions. These exhibitors plan to showcase a collection of products utilizing lighting and LED technology. Some of the confirmed product categories and their respective exhibiting brands are:

- Lighting fixtures – ESTO Lighting, GE, KNY Design, Optiled, Osram, Philips, QSSI, Reggiani, Zalux
- Lighting accessories and components – AAG Stucchi, Almeco, Arditì, BJB, Bayer
- LED chips, modules, packaging, LED lighting application – APT, CREE, Delta, Edison Corp, Epistar, Lite-on, Nichia, Seoul Semiconductor
- LED driver ICs, transformers and ballasts – Fulham, Mean Well, MOSO, Recom, Tridonic
- Product and inspection, equipment and test laboratories – Chroma, Everfine, Instrument Systems, Konica Minolta, Zvision

The list of renowned international and Chinese industry association supporters participating at the fair continues to grow every year. Their presence creates dialogue about the latest developments, challenges and opportunities in the global lighting industry.

For 2013, the fair has gained some new overseas supporters, including the Korea Photonics Technology Institute and the Lighting Council Australia. Additionally, the show is held together with a series of other events within the Light+Building portfolio. By utilizing the Guangzhou International Lighting Exhibition’s industry influence and position, buyers looking to find sources for LED, building and even solar technology can discover new business prospects.

**Green lighting and project-based business opportunities become central focuses of 2013 show**

“Go green, Think green and Act green” are some of the slogans currently emphasized in the lighting industry. LEDs particularly are an important technology in the green lighting business. For the 2013 show, a strong focus will be given to the growth of LED technology through the fair’s thematic zone “LED Asia.” The zone will be spread across eight exhibition halls, showcasing the full LED industry chain from raw material procurement to final product application.

Several national and regional pavilions are scheduled to be held within LED Asia. For Hong Kong, the Hong Kong Electronics Industries Association (HKEIA) has organized the region’s pavilion with the support of the Hong Kong Productivity Council. The pavilion will highlight the unique benefits the region’s LED lighting specialists have to offer to the international community.

Ir Raymond Chiu, Principle Consultant, Hong Kong Productivity Council, noted: “Looking forward, I am excited about our partnership with HKEIA and Messe Frankfurt. Local LED firms, working with our council at this show, can reduce their costs, extend their reach to new markets, build their brands overseas and help them meet more prospective customers effectively.”

Another key concept that follows current green trends is the compatibility of LEDs with solar technology. To highlight integrated solar business solutions, Guangzhou Guangya Messe Frankfurt Co Ltd has partnered up with WIP GmbH & Co Planungs-KG in organizing the concurrent fair “Building Solar China (Guangzhou).” The event is geared towards promoting the development of integrated solar and smart technology solutions in buildings. By hosting the two fairs concurrently, exhibitors and visitors are able to witness the connections between lighting technology and the growing integration of solar devices in building projects.

In addition, the show’s other concurrent fair “Guangzhou Electrical Building Technology” focuses on electrical
engineering as well as building and home automation and further attracts project-based buyers, allowing them to acquire both lighting products and building technology solutions at one central location. Buyers can then also witness the overlapping business potential of intelligent building with lighting technology. For lighting exhibitors, the concurrent light and building shows help them develop strategic partnerships with building technology manufactures, capture opportunities in the growing light control market and provide total solutions to various sectors of the building industry.

Both Guangzhou International Lighting Exhibition and Guangzhou Electrical Building Technology are headed by the biennial Light+Building event, which will take place from March 30 – April 4, 2014, in Frankfurt, Germany. To find out more information about the 2013 edition of the Guangzhou International Lighting Exhibition, visit www.light.messefrankfurt.com.cn or email to light@china.messefrankfurt.com.

**Korea’s Hite Brewery Company Trusts its Water to Hanovia UV**

As part of its environmentally conscious approach to brewing, Korea’s Hite Brewery Company has recently installed 25 Hanovia UV water disinfection systems at its Massan and Gangwan plants. The UV systems ensure water used in the production processes remains free from microbial contamination, ensuring a high-quality, pure final product. Seven units are installed at Massan and 18 at Gangwan.

“When Hite was considering UV for the first time it looked at a number of UV system suppliers,” commented Ying Xu, Hanovia’s Asia Pacific Sales Manager. “We were selected as our UV systems not only produced the highest microbial reduction rates, but we also offer a comprehensive and cost-effective spare parts and maintenance service. Hite now uses over 45 Hanovia UV systems in its breweries across Korea, including the latest project at Massan and Gangwan.”

“According to the company it also needs to do CIP less frequently, it uses less preservative in the finished product, and the final water has no unwanted residuals, so the taste and colour is not altered in any way. This all adds up to a cleaner, greener process and product,” she added.

In Massan the UV is used to treat clean-in-place (CIP) water (three units), cooling water injected after the CIP (three units), and activated carbon-filtered water (one unit). At the Gangwan plant three UV units are used to treat water after deaeration and the remaining 15 units treat activated carbon-filtered water.
Berson UV Systems Comply with IUVA, AWWA and DVGW Guidelines for Municipal Water

Users avoid expensive modifications to bring systems in line with current guidelines

The International Ultraviolet Association (IUVA) and the American Water Works Association (AWWA) working group has released a new communication related to low wavelength, medium-pressure disinfection. Current users of Berson UV systems have found that their equipment is already in compliance, while other installations have selected Berson to help them avoid the uncertainty factors to account for low UV wavelengths.

According to the document, legislators and engineers are now recommending the application of a correction factor for municipal drinking water medium-pressure UV systems to compensate for the effects of wavelengths less than 240nm. Pathogen surrogates used for testing have proven to react differently than actual target pathogens to these low wavelengths. Therefore, previous validation testing and modelling may have overestimated inactivation of harmful target pathogens.

While Berson systems have always blocked wavelengths less than 240nm with the use of type-240 quartz sleeves, users of similar medium-pressure systems not in compliance will be required to re-evaluate system sizing and possibly make costly modifications or purchase new equipment. Berson’s 240-type quartz sleeves also comply with DVGW (Germany) standards requiring low wavelength blockage to prevent nitrite formation.

Since the Low Wavelength Document was published, Berson has won a number of new medium-pressure UV system projects where owners are adding UV treatment for disinfection of cryptosporidium and giardia.

Berson’s type-240 quartz sleeves are used in the company’s InLine+ medium pressure, closed vessel UV disinfection system. The InLine+ is simple to install and features virtually maintenance-free operation with a standard automatic quartz sleeve wiping system and variable power ballast output. It is 3rd party–validated and conforms to the DVGW standards, the USEPA drinking water guidelines, the NWRI reuse guidelines and has also has NSF approval.

Berson (www.bersonuv.com) is a UV disinfection specialist based in the Netherlands, with installations worldwide. The company manufactures UV disinfection systems for municipal drinking water, wastewater and reuse applications.
IUVA is planning a conference in collaboration with the German Water Technology Center (TZW) at the Convention Center in Karlsruhe, Germany, June 4–5, 2013. The conference will focus on the use of UV technology worldwide to disinfect water, to reuse wastewater and other applications. Scientists, engineers and industry leaders will make presentations at the conference. Speakers will include Margret Mergen, mayor of the City of Karlsruhe, a representative from Stadtwerke Karlsruhe, which supplies water to the City of Karlsruhe, and Prof. Dr. Thomas Oppenländer from Furtwangen University, who will talk about trends and applications for UV lamps and, in particular, Excimer lamps.

The last IUVA conference in Karlsruhe was held in 2004 and was a huge success. The new event will have two parallel sessions together with an industry exhibition. Exhibitors will be allowed to give a five-minute presentation about their products, latest releases and innovations.

Don’t miss all the latest information about water treatment related UV technology topics including drinking water, wastewater, advanced oxidation or ballast water treatment. Hear about new developments, applications, research and technologies and get firsthand market intelligence. Network with top international researchers and engineers, and meet regulators and company representatives to make your involvement with UV technology a successful one.

IUVA will present an award to the best student paper and the best innovation/research paper.

Full Registration includes lunch and breaks during the day. Please indicate whether you intend to attend our conference dinner on the evening of June 4. Space is limited.

Full registration is €590. Student registration is €260. One-Day registration is €295. All IUVA members will receive a 10 percent discount. For more information, visit: http://iuva.org/event/karlsruhe-germany

If you have trouble with online registration, call +49 5221 104 143 or e-mail Andreas.Kolch@iuva.org or the IUVA main office at info@iuva.org

Sponsorship and industry exhibition booth opportunities are available. Email deb.martinez@iuva.org or call +1-202-422-2445 to inquire about sponsorship or exhibition booths.
IUVA and IOA will hold their third joint World Congress and Exhibition September 22-25, 2013, at the Mirage Hotel and Casino. This event will combine the 20th IOA World Congress and the 6th IUVA World Congress.

This World Congress will be the latest in a series of successful congresses organized worldwide by IUVA and IOA to provide an international forum for all concerned with fundamental, engineering and applied aspects of oxidation techniques involving ozone and related oxidants and/or UV techniques.

The conference will provide current technical, process and operational information for engineers, scientists, and end users of UV, ozone and advanced oxidation technologies.

Abstracts accepted for oral presentation will include a 25-minute oral presentation followed by five minutes of Q&A. Abstracts accepted for poster presentation will include a 5-minute oral presentation session followed by a 45-minute Q&A session at each poster session.

The Executive Committee and membership of IUVA are proud to present seven different achievement awards in the field of UV technologies. IUVA makes these awards every two years to formally acknowledge major achievements and milestones by scientists, engineers and students studying UV technology and its applications. The awards will include:

- Lifetime Achievement Award
- Best Student Paper/Poster Award
- UV Engineering Project of the Year
- UV Light Award for Volunteer Recognition
- Best UV Paper Award
- UV Product Innovation Award
- Green UV Award

For more information about registering and attending the World Congress, visit http://www.worldcongress2013.org/.
UV Disinfection Knowledge Base

By Jennifer Osgood and Kati Bell, CDM Smith

Ultraviolet (UV) disinfection has been used in drinking water in Europe since the 1950s and wastewaters in North America for nearly two decades. While this track record suggests UV disinfection is an established technology, the practice of UV disinfection in drinking water has evolved considerably over the last decade. Research in the late 1990s demonstrated UV inactivation of Cryptosporidium and Giardia at very low doses, resulting in approval of the technology to achieve Cryptosporidium, Giardia, and virus credits under the U.S. Environmental Protection Agency (EPA) Long Term 2 Enhanced Surface Water Treatment Rule. This regulatory acceptance has resulted in increased implementation of UV disinfection throughout North America. Surface water treatment plants in the United States and Canada have installed UV disinfection for applications ranging from 0.5 to 2,200 million gallons per day (mgd).

Recognizing the opportunities for UV disinfection, manufacturers have developed new drinking water technologies. Advances including mercury amalgam and low pressure high-output (LPHO) UV lamps, high-power medium-pressure (MP) UV lamps, physical-chemical cleaning systems, UV sensors systems, UV dose monitoring systems, UV dose-pacing algorithms, have resulted in development of UV reactors capable of treating flow rates greater than 50 mgd. Other improvements to the science and practice of UV disinfection include new UV dose modeling approaches based on validation testing and computational fluid dynamics (CFD). Advances in regulations include the development of UV validation protocols and test facilities, as well as the development of EPA’s UV Disinfection Guidance Manual (UVDGM) for design and operation of drinking water UV disinfection systems.

WRF Project 3117
As is the case with any rapidly evolving water treatment technology, utilities, engineers, and state regulators have questions and concerns with UV disinfection. The Water Research Foundation (WaterRF) saw a need to document industry practices and to fill important gaps in available information that limits how utilities, engineers, and regulators implement and operate UV disinfection technologies. Filling in these data gaps will significantly reduce the risks and costs of applying UV disinfection. Thus, the Water Research Foundation funded Project 3117 that was designed to answer these questions by developing a UV Disinfection Knowledge Base. The document, which is available at http://www.waterrf.org/Pages/Projects.aspx?PID=3117, was developed using a survey based approach that sought to:

- Identify issues and questions with drinking water UV disinfection from participating utilities, regula-
tors, and consultants
• Collect and analyze UV system data through surveys of participating utilities and field evaluations of installed systems
• Conduct an evaluation of mercury release with the breakage on LPHO and MP lamps and develop engineering approaches for mitigating mercury release

The final document, which includes survey data collected during the spring of 2008, indicates that 161 utilities in Canada and 148 in the US have installed or are implementing drinking water UV disinfection at plant flows greater than 0.5 mgd. There is more specific information on the systems surveyed including:
• Who is implementing UV and what types of systems are they installing
• What are the UV treatment objectives (see Figure 1)
• UV system design criteria
• Installation configurations

• Performance of UV system components
• Replacement costs for UV system components
• UV system operation and maintenance
• Lessons learned and recommendations

Summary
The resulting document was authored by a team of industry experts including:

Harold Wright, David Gaithuma, and Mark Heath
Carollo Engineers, P.C., Boise, Idaho

Chris Schulz and Travis Bogan
CDM Smith, Denver, Colorado

Alexander Cabaj and Alois Schmalweiser
Institute of Medical Physics and Biostatistics of the University of Veterinary Medicine, Vienna, Austria

Marcia Schmelzer and Janet Finegan-Kelly
City of Boise, Idaho

The document is a culmination of industry data and information collected through the WRF Project 3117 survey that reports on the comprehensive experience of UV disinfection at water treatment plants in the U.S. and Canada, provides numerous recommendations for utilities planning to implement UV disinfection and those already operating UV systems, and serves as an invaluable tool for utilities, regulators, design engineers, operations staff and others.
Hospital associated infections (HAI) s are not a new problem. Historically, if you were unfortunate enough to be deposited into hospital your chances of dying of infection increased substantially.

The first practitioner to preach and practice infection control (IC) was Ignaz Semmelweis in the maternity clinics of Vienna starting in 1847. He was the thankless champion of hand disinfection though he was unable to prove why hand hygiene could so profoundly reduce puerperal fever. The majority of his colleagues ridiculed him, indignant at the thought that the hands of practitioners could be vectors of unnecessary sickness and death. The “miasma” theory prevailed.

But only a few decades later, Louis Pasteur and Edward Koch’s work unveiled the biological and causal evidence to support the convictions of Semmelweis who tragically died in disgrace from beatings and septicemia in an asylum.

The work and sacrifice of these exceptional men and hundreds of other notable and unrecognized men and women ultimately led to the development of antibiotics that were safe, reliable, but eventually very overprescribed.

Today an estimated one in 20 hospitalized patients will acquire an HAI translating into more than 1.7 million new HAI’s in U.S. hospitals each year.\(^1\) Annually these HAI’s result in nearly 100,000 deaths and cost the U.S. health care system $6 billion in direct medical costs for preventable HAI’s.\(^1,^2\)

**Many of those infections now involve multidrug-resistant organisms (MDRO)**

Standard methods for infection control and microbial control in healthcare are:

- Hand Washing-Chemical and Mechanical Disinfection Processes
- Room and Surface -Chemical and Mechanical Cleaning and Disinfection Processes (“Terminal Cleaning”)
- Designated Isolation Rooms and Pressurization for Air Distribution Control
- Laminar Air Flow
- Hepa Filtration
- Temperature and Humidity Control
- Universal and specialized IC Precautions-Gowning, masks, gloves etc.
- Establishing Sterile Surgical Fields

Awkwardly absent is Ultraviolet Germicidal Irradiation (UVGI) technology as supportive method of infection control for air and surface disinfection. The underutilization of UVGI technology for infection control in hospital and health care facilities becomes more questionable as common bacteria previously controlled with antibiotics and good sanitation become more resistant and able to pass on their genetic resistance factors to other bacterial species that did not have that resistance before.

UVGI’s capabilities as a biocidal warrior for water, air, and surface disinfection have been demonstrated for more than a century. UVGI doesn’t differentiate between MDRO and organisms still controlled with antibiotics. The correct “dose”\(^3\) of UVGI easily kills staphylococcus aureous bacteria (including MRSA), vancomycin resistant enterobacteriarecea, (VRE) and carbapenum resistant enterobacteriarecea (CRE) gram negative, gram positive and mycobacterium. Even the spore formers, norroviruses and fungi are inactivated or killed. With proper design and basic maintenance UVGI performs 24-7.

Hospitals are buildings where many sick and injured people receive care by other people. Buildings are necessary for the transmission of almost all airborne human diseases as compared to outdoor air where any microbes ejected by a sneeze will usually rapidly disperse to harmless levels and or perish from sunlight, dehydration, or other factors.\(^4\)

In hospitals patients have decreased mobility; their confinement limits the source of air they breathe and re-breathe. Additionally, surface contact is repetitive and bio-loads are heavier within their area of care. The longer the patient stays and more frequent the hospital visits, the higher the risk of HAI.

In 2008 when ASHRAE published a new chapter on UVGI technologies in the handbook “HVAC Systems
& Equipment,” it provided best practice guidelines for building engineers including those in healthcare operations to follow for air handling unit and duct surface disinfection. It was anticipated that the guidelines would facilitate a broader acceptance and utilization of UVGI in healthcare infection control practices.

But thus far no warm embrace has been realized from the healthcare industry. Response has been mixed and slow. With the exception of a few select hospitals, U.S. hospitals have used it sparingly or not at all.

The October 2012 issue of The Abell Report, a newsletter published by the Baltimore-based Abell Foundation, included an article titled “Green Technology to Fight Hospital-Linked Infections,” which took an in-depth look at the healthcare industries response to UVGI technology. The lack of uniform industry-wide standards supporting applications and or efficacy ratings for devices and installations were the most widely cited reasons for the small role UVGI continues to play in healthcare infection control. 5

A leading healthcare expert in infectious disease and safety Peter Provonost, M.D., director of the Armstrong Institute for Patient Safety and Quality at Johns Hopkins University, opined “what we have here with UVGI is market failure. Companies need a place to test but also to work with integrators. That’s why hospitals may not be adopting these technologies more quickly.”6

In fairness to the technology, citing building system variables such as pressure differentials, temperature changes, and room size, components, and materials) as reasons not to utilize UVGI could just as reasonably be used to question the efficacy of hundreds of medications prescribed to people with varying physiological functionality. Yet prescribed they are, and outcomes are frequently not known.

Reputable UVGI manufacturers and dedicated researchers and design consultants are prevalent in the UVGI industry. Many of these people have dedicated their whole professional lives to this exceedingly valuable technology and want to see its possibilities maximized and its potential for infection control and air quality improvement fully realized. It is already effectively being used abundantly for water disinfection.

Companies such as Sanuvox, Lumalier, UVDI, American Ultraviolet and UVR have been manufacturing high quality UVGI for HVAC, in-duct, and room air disinfection for years.

Lumalier’s TRU-D is a high-output portable UVGI system designed for intense surface disinfection in healthcare, specifically highly contaminated areas, isolation rooms, and operating rooms. High-quality UV lamps manufactured by companies such as Philips have been providing uniformly accurate and standardized output lamps with all manufactured specifications for years.

Coming up with new UVGI applications and products for infection control are companies such as Germ Guardian. For instance, its instant bare and gloved hand disinfection dispenser is able to provide fast object disinfection within an aseptically sealed pouch and a flexible surface decontamination delivery system. Germ Guardian has also invented a fast read-out UVGI monitoring and fast read-out UVGI disinfection assurance system for UVGI efficacy validation.

Better field testing capabilities will add further strength to validating UVGI system efficacy. And UVGI standards and peer-reviewed studies on its use are being developed.

The question is: Will the healthcare industry be willing to give the technology a prominent place as a strategic weapon in the infection control arsenal to reduce hospital acquired infections, staff illness, and save lives?

3. J/cm²=Time of Exposure to UVGI multiplied by the UV irradiance level or W/cm².
5. Abell Report, October 2012
6. Abell Report, October 2012
Cobb County, Georgia, opened its Mountain View Aquatics Center in 2000 and fell victim to the ongoing problems that plague almost every indoor aquatics center around the world: poor air quality, poor water quality and corrosion of its stainless steel equipment.

Robert McCallister, CPRP, Aquatics Director for the Cobb County Parks, Recreation, and Cultural Affairs, did not just stand by and watch his new facility fall apart during its first few years of inception. Tax payers spent a considerable amount of money to build the premier facility and the community support was tremendous.

The pools were crowded at all times of the day throughout the year, a tribute to the skill of programming. However, it was apparent that action was required to account for the poor air quality, water quality, and corrosion that was caused by the by-product of treating the water with chlorine-based chemicals that combine with ammonia compounds (oil, sweat, etc.) to produce “chloramines.”

After countless hours of research and trying several options, Cobb County turned to UV treatment as a solution for their Mountain View facility’s chloramine issue. McCallister was very skeptical at first as Cobb County had storage rooms full of products, each claiming to be the best solution to the problem. After a guarantee was provided by a U.S.-based UV company, McCallister decided to move forward with the UV system.

A caveat struck during the deal was the understanding that if the UV systems did not perform to the level guaranteed, the manufacturer would remove the UV system at no cost to Cobb County. To perform as promised meant the combined chlorine levels would be an average of 0.3 ppm or less at all times.

Several factors went into the sizing and design of the UV system at the Mountain View Facility.

• Taking into account the laws of dilution as they affect UV system performance, it takes 3.5 times the turnover rate for every drop of water to pass through the UV system. Therefore, if the pool was on a six-hour turnover rate, a UV system would need 21 hours to fully treat all poolwater. Based on this principle, some water will be treated several times and some will only pass through the UV light once

• Combined chlorine readings should be lowest in the morning, as the UV system operated throughout the night with no bathers or demand on the pool. Combined chlorine levels will then continue to rise throughout the day as the bather load starts to increase and peaks usually in mid-afternoon. Sizing of the system must take into account the peak load on the pool, to ensure that combined chlorine levels are kept within the specified levels

• To test combined chlorine levels and prove the performance of the UV system, a sample port should be installed directly before and after the UV system. Taking a sample before and after the UV system will show the reduction in combined chlorine, which was guaranteed to be between 0 and 0.3

After two weeks of operation, the facility reported a drastic decrease in combined chlorine levels, and an improvement in the air quality and water quality at the facility (Figure 1). The facility decided to purchase the UV systems before the guarantee period offered by the manufacturer expired.

Cobb County has several facilities in operation today and each one has installed a UV system as the standard solution for reducing chloramines. Not only do the sites have better air and water quality, along with improved life of stainless steel, but they now also receive the added benefits of UV disinfection.
Nine years after installation, the UV system continues to perform as well as it did after its inception with only standard, routine maintenance. The lamp is changed yearly, with several lamps lasting over 10,000 hours, versus the 8,000 hours warranted by the manufacturer.

The science behind UV lamp technology is continuing to improve. On average, medium pressure UV lamps last approximately 8,000 hours and most manufacturers will warranty them for 4,000 hours. The quartz sleeve and automatic wiper seals and rings are changed every 2 - 2.5 years. This accounts for all of the routine manufacturer’s maintenance that is required on the UV system.

As swimming pool natatorium design and construction evolves to keep up with the changing HVAC codes, it is important to keep in mind that the UV system is treating the water, not the air. The laws of dilution will limit the effectiveness of a UV system during peak events, such as swim meets when hundreds of swimmers use the pool continuously for several hours.

Cobb County is well aware that during a swim meet, the combined chlorine before the UV may be 0.7 ppm, and between 0-0.2 ppm after the UV. But the air quality will be worse than normal during this period due to the higher bather load. Cobb County wanted to ensure the safety of not only their swimmers but the staff and patrons watching the meets as well, so they also installed an additional HVAC device to operate during these peak hours and remove the airborne chloramines. This dual approach has ensured the protection of the swimmers and the public.

The UV system gave Cobb County the peace of mind that their chloramine problem was being addressed, but also delivered the added benefits of UV disinfection immediately upon installation. The majority of new pools being designed and constructed will have a UV system installed as base bid equipment. The staff at aquatic facilities will not experience the “monster” that comes along with managing an indoor natatorium.

According to McCallister, “I’m convinced that the UV system combined with the HVAC chloramine evacuation system make Cobb County’s facilities some of the finest aquatic venues in the county.”

Dr. John C. Psaroudis is a graduate of West Liberty State College with a BS degree in Chemistry and a Doctorate from West Virginia University. He has worked in the ultraviolet disinfection industry for the past 10 years dealing with both ultraviolet disinfection and chloramine destruction.

Dr. Psaroudis held the position of National Sales Manager for PurAqua Products and is currently the National Aquatics Sales Manager for Aquionics Inc., a manufacturer of ultraviolet disinfection technology for water and wastewater in the industrial, municipal, and aquatics markets.
The need for clean water
Many people are concerned with the quality of water, because microorganisms present in water can make them ill. In emerging economies the water infrastructure is often to blame, yet even in developed countries incidents of contamination still occur. As one study shows, in North America alone 85% of sicknesses in children and 65% of adult diseases are a result of waterborne viruses and bacteria.¹

Disinfection of water
UV technology is a natural way to make sure water is safe to drink. UVC deactivates microorganisms, rendering them harmless. It is effective against all types of bacteria, viruses and protozoa and there are no known pathogens resistant to it. Moreover, it does not add chemicals or other additives that may be harmful to human health or the environment. It doesn’t alter the taste, pH value or other properties of the water either.

InstantTrust: a new cutting-edge disinfection technology
Philips has developed a complete disinfection solution for point-of-use equipment based on a patented disinfection technology – InstantTrust. It breaks new ground, overcoming four key limitations of existing UV disinfection systems: size, run-up time, temperature sensitivity and environmental impact. InstantTrust is half the size or less of existing disinfection functions, which means it can be built into almost any POU application, from fixed taps to portable pitchers. Moreover, it provides an instant start with no run-up period so that safe water is delivered from the very first second onwards – eliminating waiting time and the risk that the water is not always disinfected. It can be used for both cold (4°C) and hot water applications – an industry first – thanks to its constant temperature curve. From an environmental perspective it is completely mercury free.

A broad range of applications
With demand for residential purifiers increasing every day², this new technology with its promise of almost complete design freedom comes at a good time. Its benefits make it ideally suited for instantly disinfecting small quantities of cold water (up to 4 liters/minute) taken from dispensing equipment such as bottle refill stations, bottled water dispensers and for example. Other point-of-use applications include hot and cold water systems with taps and under-the-sink water treatment systems.

With the introduction of InstantTrust, Philips has a unique and innovative UV-based water disinfection solution that improves access to safe drinking water around the world.

¹ UV Disinfection (Source: Excel Water Technologies)
² Global Competitive Environment for Residential Water Treatment Equipment Markets (Source: Frost & Sullivan 2005)