

ACS **SUNDAY** | March 25 2012 | **SAN DIEGO**

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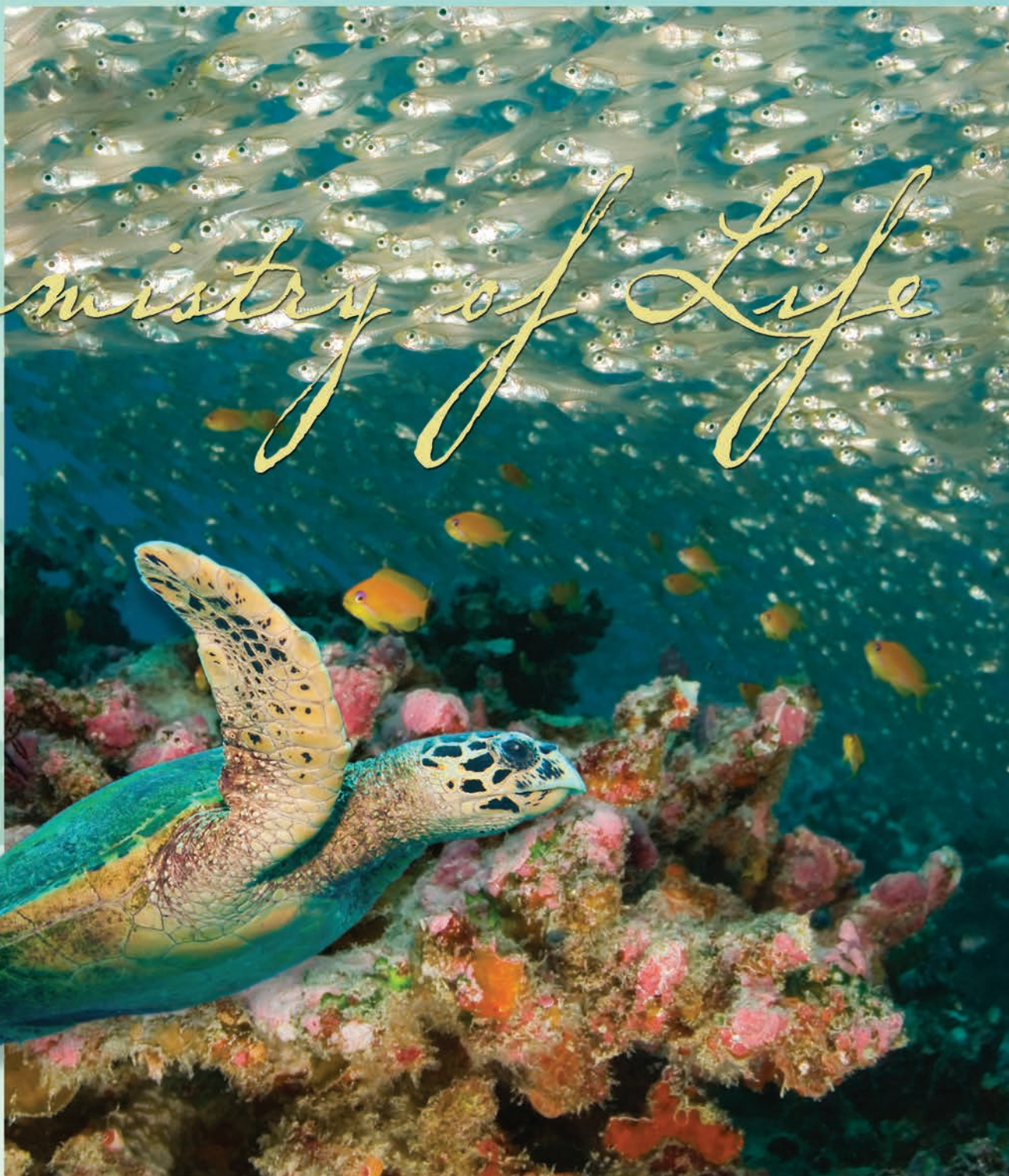
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Welcome to San Diego

It is with great pleasure that I welcome you to the 243rd ACS National Meeting held in the midst of a major international hub for advancing research, education, innovation, trade, manufacturing, national security, and technology. Our meeting program is rich in scientific, educational, and professional content and I am sure you will make wise choices to satisfy your needs and expectations.

Our meeting theme "Chemistry of Life" will cover advancements made in basic and applied research both at the molecular and macroscopic levels. The Plenary Session took place today from 3:30–6:15 pm at the San Diego Convention Center. The agenda for today's ACS Board of Directors open meeting dealt with the future of graduate education in the chemical sciences.

My 2012 ACS presidential theme is, "Advancing Chemistry and Com-

municating Chemistry." On Monday from 8:30–10:45 am, a Presidential Symposium, Production of Fuel Directly from Sunlight: A Grand Challenge for Chemistry of the 21st Century, will be held at the San Diego Marriott Marquis, Marina Ballroom G (South Tower, Lower Level 3).

NSF director Subra Suresh will deliver a Presidential Plenary address at 11 am Monday at the San Diego Marriott Marquis & Marina, Marina Ballroom G (South Tower, Lower Level 3).

This meeting features the second Presidential Symposium on Communicating Chemistry to the Public, from 1–5 pm Monday in the San Diego Convention Center Room 4 (Upper Level). Communicating chemistry to fellow scientists and to the world is one of the ACS core functions. Communicating the values and role of the chemical sciences to non-specialists is another



Bassam Z. Shkhashiri

Ballroom Salon A, from 8:45 am–5:10 pm.

On Wednesday, the ACS Council will meet in the San Diego Marriott Marquis & Marina Hotel, Marriott Hall, to consider a full agenda including a special topic discussion on the ACS Climate Science Toolkit.

of our important responsibilities.

This meeting also features the third Kavli Foundation Innovations in Chemistry Lecture to be presented Monday at 5:30 pm in the San Diego Convention Center, Room 20A (Upper Level) by UC-Berkeley Professor Carolyn Bertozzi.

On Tuesday, an all-day Presidential Symposium on Catalysis is sponsored by The Camille & Henry Dreyfus Foundation, at the San Diego Marriott Marquis, San Diego

Visit the ACS Exposition in Halls A/B of the San Diego Convention Center to learn about scientific and industrial trends, discover effective technologies and services, and network with more than 250 exhibitors who serve chemical professionals.

Bassam Z. Shkhashiri, PhD
ACS President
Professor of Chemistry
University of Wisconsin-Madison

New and Improved: ACS Network 3.0

In roared 2012 and with it a powerful new version of the ACS Network, a significant change for the better. Among the highlights:

- Navigation bar and menus to help you find what you're looking for more easily
- Visual design that highlights the most popular and timely content
- Full menu of personal settings that gives you more control of the emails you receive
- Track and follow conversations and get notifications and alerts

- on just the content you want
- Events module lets you create and invite others to events and view calendars
- Native iPhone app that you download to your device (in addition to the current web-based one)

Attend an ACS Network presentation in the ACS Theater on Monday at 11 am and Tuesday at 10:30 am to see the changes live and in action. It will be replete with the best tools to help navigate the upgraded plat-



form and a demonstration on how to use the new features.

Additionally, the ACS Web staff will be on hand to give personalized and guided tours as an added bonus, Friend and Follow the ACS Molecule of the Week and get a free MOTW

t-shirt while supplies last.

The ACS Network is the place to build relationships in chemistry—whether to meet new people or to keep in touch with the ones you already know.

The new functionality and upgraded platform deserve a first look or a return visit. If you're a new user or loyal member, here's what you can expect from the next generation in online professional networking and community building, hosted by the American Chemical Society.

Visit ACS at Pavilion 731. ♦

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As the ACS was gearing up for the start of its 243rd National Meeting and Exposition in San Diego, the city was hosting Expo Day on Saturday. The grand-slam-science-finale at PETCO park capped off the city's fourth annual week-long Festival of Science and Engineering. The free-to-the-community event was expected to attract more than 20,000 kids, families, scientists, engineers, and educators.



At deadline... At deadline... At deadline... At deadline... At deadline...

Upcoming Chemistry Olympiad to Highlight Students' Achievements

With the ACS as its organizer, the 44th International Chemistry Olympiad, the world's premier contest for secondary chemistry students, begins July 21 near Washington, DC. The 10-day competition is expected to attract participants from 70 countries. **Dow Chemical**—the event's sole sponsor—has invested \$2.5 million to bring the event to the U.S.

for the first time since 1992. The Olympiad includes exams, laboratory work, and scientific and cultural excursions based at the University of Maryland, College Park. The competition will cover several areas of chemistry, including: analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, physical chemistry, and spectroscopy. Each of the qualifying four-student teams is typically chosen through

a series of regional and national Olympiads.

Agreement Initiates Development for Pathogens Detection, Analysis

Agilent Technologies has entered into a cooperative research and development agreement with the U.S. Food and Drug Administration to develop new tools to detect and analyze pathogens in food. The joint R&D effort will also seek to improve

DNA-based tools for confirming that seafood is correctly labeled. The goal of the first part of the project is to develop a novel assay panel to identify subtypes of salmonella in food. When outbreaks occur, knowing the subtype can help officials quickly identify the source of the pathogen and hopefully limit the number of victims. The research will focus on using mass spectrom-

See **At deadline...** page 7

Materials inspired by Mother Nature: One-pound boat that could float 1,000 pounds



ACS Initiatives for 2012: Communication is Crucial

Initiatives on climate science, the education of future scientists, and commemoration of a landmark federal law that engendered some of the nation's greatest universities are among the initiatives set by Bassam Z. Shakhshiri, president of the American Chemical Society (ACS), at a press conference today. Those initiatives will be the theme of his presidential year.

A chemistry professor who holds the William T. Evjue Distinguished Chair for the Wisconsin Idea at the University of Wisconsin-Madison, Shakhshiri discussed the projects during a press briefing at the ACS' 243rd National Meeting & Exposition. Almost 18,000 scientists and

others are expected to attend the meeting, one of the largest scientific gatherings of 2012. They will hear more than 11,700 reports Sunday through Thursday on new advances in scientific fields that range from astronomy to zoology, and view new laboratory instruments, books, journals and other products in the large exhibition.

After ACS' founding in 1876, a tradition emerged that each new ACS president defines a theme and identifies initiatives for the society during his or her year in office. Shakhshiri's theme, "Advancing Chemistry and Communicating Chemistry," incorporates responses to some of the great challenges facing scientists and society in the 21st century.

"As a learned society, ACS and its members have significant responsibilities to bring our scientific and educational acumen to address human needs," said Shakhshiri. "We advance chemistry through research, education, and innovation. Communicating chemistry to fellow scientists and to the world is one of ACS' core functions. Communicating the values and role of the chemical sciences to non-specialists is another of our important responsibilities."

Shakhshiri's initiatives involve the 150th anniversary of a landmark federal law called the Morrill Land Grant Act, education of scientists at the graduate level for the 21st century and climate science.

Morrill Land Grant Sesquicentennial Celebration

This initiative commemorates the 150th anniversary of the Morrill Land Grant Act of 1862, which provided states with 30,000 acres of land for each of its members of Congress. States sold the land to raise money to establish colleges focusing on agriculture, science, engineering and liberal arts. Without that money, it would have been impossible for states to fund such institutions. A second Morrill Act in 1890 was passed specifically to support land-grant institutions for African-Americans. Today, more than 100 institutions have land-grant status, including many historically Black colleges

Combining the secrets that enable water striders to walk on water and give wood its lightness and great strength has yielded an amazing new material so buoyant that, in everyday terms, a boat made from one pound of the substance could carry five kitchen refrigerators, about 1,000 pounds.

One of the lightest solid substances in the world, which is also sustainable, it was among the topics of a symposium Sunday that focused on an emerging field called biomimetics. In biomimetics scientists literally take inspiration from Mother Nature, probing and adapting biological systems in plants and animals for use in medicine, industry and other fields.

Olli Ikkala described the new buoyant material, engineered to mimic the water strider's long, thin feet and made from an "aerogel" composed of the tiny nano-fibrils from the cellulose in plants. Aerogels are so light that some of them are denoted as "solid smoke." The nanocellulose aerogels also have remarkable mechanical properties and are flexible.

"These materials have really spectacular properties that could be used in practical ways," said Ikkala.

He is with Helsinki University of Technology in Espoo, Finland. Potential applications range from cleaning up oil spills to helping create such products as sensors for detecting environmental pollution, miniaturized military robots, and even children's toys and super-buoyant beach floats.

Ikkala's presentation was among almost two dozen reports in the symposium titled, "Cellulose-Based Biomimetic and Biomedical Materials," that focused on the use of specially processed cellulose in the design and engineering of materials modeled after biological systems. Cellulose consists of long chains of the sugar glucose linked together into a polymer, a natural plastic-like material. Cellulose gives wood its remarkable strength and is the main component of plant stems, leaves, and roots. Traditionally, cellulose's main commercial uses have been in producing paper and textiles—cotton being a pure form of cellulose. But development of a highly processed form of cellulose, termed nanocellulose, has expanded those applications and sparked intense scientific research. Nanocellulose consists of the fibrils of nanoscale diameters so small that 50,000 would fit across the width

of the period at the end of this sentence.

"We are in the middle of a Golden Age, in which a clearer understanding of the forms and functions of cellulose architectures in biological systems is promoting the evolution of advanced materials," said Harry Brumer, of Michael Smith Laboratories, University of British Columbia, Vancouver. He was a co-organizer of the symposium with J. Vincent Edwards, a research chemist with the Agricultural Research Service, U.S. Department of Agriculture in New Orleans, LA. "This session on cellulose-based biomimetic and biomedical materials is really very timely due to the sustained and growing interest in the use of cellulose, particularly nanoscale cellulose, in biomaterials."

Ikkala pointed out that cellulose is the most abundant polymer on Earth, a renewable and sustainable raw material that could be used in many new ways. In addition, nanocellulose promises advanced structural materials similar to metals, such as high-tech spun fibers and films.

"It can be of great potential value in helping the world shift to materials that do not require

petroleum for manufacture," Ikkala explained. "The use of wood-based cellulose does not influence the food supply or prices, like corn or other crops. We are really delighted to see how cellulose is moving beyond traditional applications, such as paper and textiles, and finding new high-tech applications."

One application was in Ikkala's so-called "nanocellulose carriers" that have such great buoyance. In developing the new material, Ikkala's team turned nanocellulose into an aerogel. Aerogels can be made from a variety of materials, even the silica in beach sand, and some are only a few times denser than air itself. By one estimate, if Michelangelo's famous statue David were made out of an aerogel rather than marble, it would be less than five pounds. ♦



and universities. Cornell University, The University of Wisconsin-Madison, Ohio State University, and Tuskegee University are just a few examples of land-grant institutions. Land-grant institutions today produce more than half of all PhD scientists.

ACS will celebrate this occasion with a retrospective and a prospective look at chemistry. For a "look back," Shakhshiri invites chemists to join in by publicizing the accomplishments of chemical scientists from their institutions, regardless of land-grant status. "We should embrace and celebrate our rich contributions as chemists, as a discipline, and as a professional society to the larger society in which we live," he said. He explained that the 243rd National Meeting & Exposition be-

ing held here this week offers many opportunities to "look ahead" at where chemistry is going. Attendees will hear about the latest chemistry innovations directly from scientists who are on the cutting edge.

ACS Presidential Commission on Graduate Education

Graduate education is advanced education that students pursue, typically after earning a bachelor's, or undergraduate, degree. Graduate education includes doctoral degrees, or PhDs, almost 50,000 of which are granted annually. Students in science PhD programs typically take courses for the first two or three years, then conduct research. The programs may last four to six years. Afterwards, newly-minted PhDs may join the



Bassam Z. Shakhshiri

workforce or continue as "postdoctoral fellows" for another two to three years before seeking jobs in academia or industry.

The commission will examine the purposes of graduate education and research in the chemical sciences and the needs and aspirations of graduate students. The commission is chaired by Larry R. Faulkner, president emeritus of the University of Texas at Austin. Paul L. Houston is executive director and dean of the College of Sciences and professor, School of Chemistry and Biochemistry at the Georgia Institute of Technology. The commission and its working groups will have "listening sessions" with graduate students, postdoctoral scholars, early-career faculty, underrepresented groups, business groups, institutions of higher education, professional and educational organizations,

See **Initiatives** page 12

The “Perfect Snack Food”

Popcorn Has Even Higher Antioxidants Than Fruits and Vegetables

Popcorn’s reputation as a snack food that’s actually good for health popped up a few notches today as scientists reported that it contains more of the healthful antioxidant substances called “polyphenols” than fruits and vegetables. They spoke at the 243rd National Meeting & Exposition of the American Chemical Society (ACS), the world’s largest scientific society, being held here this week.

Joe Vinson, a pioneer in analyzing healthful components in chocolate, nuts, and other common foods, explained that the polyphenols are more concentrated in popcorn, which averages only about 4 percent water, while polyphenols are diluted in the 90 percent water that makes up many fruits and vegetables.

In another surprising finding, the researchers discovered that the hulls of the popcorn—the part that everyone hates for its tendency to get caught in the teeth—actually has the highest concentration of polyphenols and fiber.

“Those hulls deserve more respect,” said Vinson, who is with the University of Scranton in Pennsylvania. “They are nutritional gold nuggets.”

The overall findings led Vinson to declare, “Popcorn may be the perfect snack food. It’s the only snack that is 100 percent unprocessed whole grain. All other grains are processed and diluted with other ingredients, and although cereals are called ‘whole grain,’ this simply means that over 51 percent of the weight of the product is whole grain. One serving of popcorn will provide more than 70 percent of the daily intake of whole grain. The average person only gets about half a serving of whole grains a day, and popcorn could fill that gap in a very pleasant way.”

Vinson cautioned, however, that the way people prepare and serve popcorn can quickly put a dent in its healthful image. Cook it in a potful of oil, slather on butter or the fake butter used in many movie theaters, pour on the salt; eat it as “kettle corn” cooked in oil and sugar—and popcorn can become a nutritional nightmare loaded with fat and calories.

“Air-popped popcorn has the lowest number of calories, of course,” Vinson said. “Microwave popcorn has twice as many calories as air-popped, and if you pop your own with oil, this has twice as many calories as air-popped popcorn. About 43 percent of microwave popcorn is fat, compared to 28 percent if you pop the corn in oil yourself.”



Photo Credit: Terry Connors

Joe Vinson, study leader, readies a bowl for tests in the lab

Likewise, Vinson pointed out that popcorn cannot replace fresh fruits and vegetables in a healthy diet. Fruits and vegetables contain vitamins and other nutrients that are critical for good health, but are missing from popcorn.

Vinson explained that the same concentration principle applies to dried fruit versus regular fruit, giving dried fruit a polyphenol edge. Previous studies found low concentrations of free polyphenols in popcorn, but Vinson’s team did the first study to calculate total polyphenols in popcorn. The amounts of these antioxidants were much higher than previously believed, he said. The levels of polyphenols rivaled those in nuts and were up to 15 times greater than whole-grain tortilla chips.

The new study found that the amount of polyphenols found in popcorn was up to 300 mg a serving compared to 114 mg for a serving of sweet corn and 160 mg for all fruits per serving. In addition, one serving of popcorn would provide

13 percent of an average intake of polyphenols a day per person in the U.S. Fruits provide 255 mg per day of polyphenols and vegetables provide 218 mg per day to the average U.S. diet,

Michael Coco, an undergraduate chemistry student at the University of Scranton who participated in the study, said he benefited in several ways. “From working on this project with Dr. Vinson, I’ve gained experience and many insights in doing scientific research,” said Coco. “Besides the obvious things like learning how to use instrumentation and perform analyses, I’ve also learned that research is extremely satisfying, especially when you discover or think of something no one else has thought of.”

The scientists acknowledged funding from the University of Scranton. ♦



New ACS Journals Set a High Standard for Success

ACS journals introduced since 1999 are serving the community well, as evidenced by a median 2010 ISI Impact Factor of 5.327 and several journals that are already leaders in their respective fields. In the 2010 Journal Citation Reports by Thomson Reuters, ACS Publications were ranked No.1 in 14 ISI categories, including the seven chemistry categories.

Organic Letters, launched in 1999, is the highest impact communications journal in organic chemistry. Launched in 2005, *Journal of Chemical Theory and Computation* earned ACS a new No. 1 ranking in Impact Factor in the Physics—Atomic, Molecular, & Chemical category.

ACS Nano and *ACS Applied Materials & Interfaces*, launched in 2007 and 2009 respectively, have both been named 2011 Rising Stars multiple times in their fields by Essential Science Indicators from Thomson Reuters.

These recent successes are a



product of the ACS's high standards in peer-review, the leadership of ACS editors—all of whom are practicing researchers—and the contributions of ACS authors and reviewers. Stop by the ACS booth to learn more about the two latest journals: *ACS Synthetic Biology* and *ACS Macro Letters*, both of which began publication in 2012.

At the ACS booth take the ACS Publications Challenge to test your

knowledge of the leading journals in chemistry and the related sciences and win a free 4GB flash drive while supplies last. Each day at noon a special presentation at the Main ACS Stage alerts the audience about what's new from ACS Publications—from new journals to new member benefits that expand access to more than 1 million articles and book chapters.

Visit ACS at Pavilion 731. ♦

From **At deadline...** page 3

etry-based genotyping to quickly identify salmonella subtypes. The second part of the agreement—to be carried out in collaboration with both the FDA and the Campden BRI laboratory in the U.K.—aims to update Agilent's lab-on-a-chip method of DNA analysis to identify fish species. Agilent's analytical technique can identify species even after the fish has been processed, which generally removes identifying features such as the head, tail, and skin. The technology is based on the Agilent Bioanalyzer, using restriction fragment length polymorphism. The goal is to make this technology fast, inexpensive, and simple enough that many kinds of laboratories can use it on a routine basis. This type of test could detect such things as intentional mislabeling to avoid tariffs and import restrictions or economic fraud where a less expensive species of fish is sold as a more costly species. ♦

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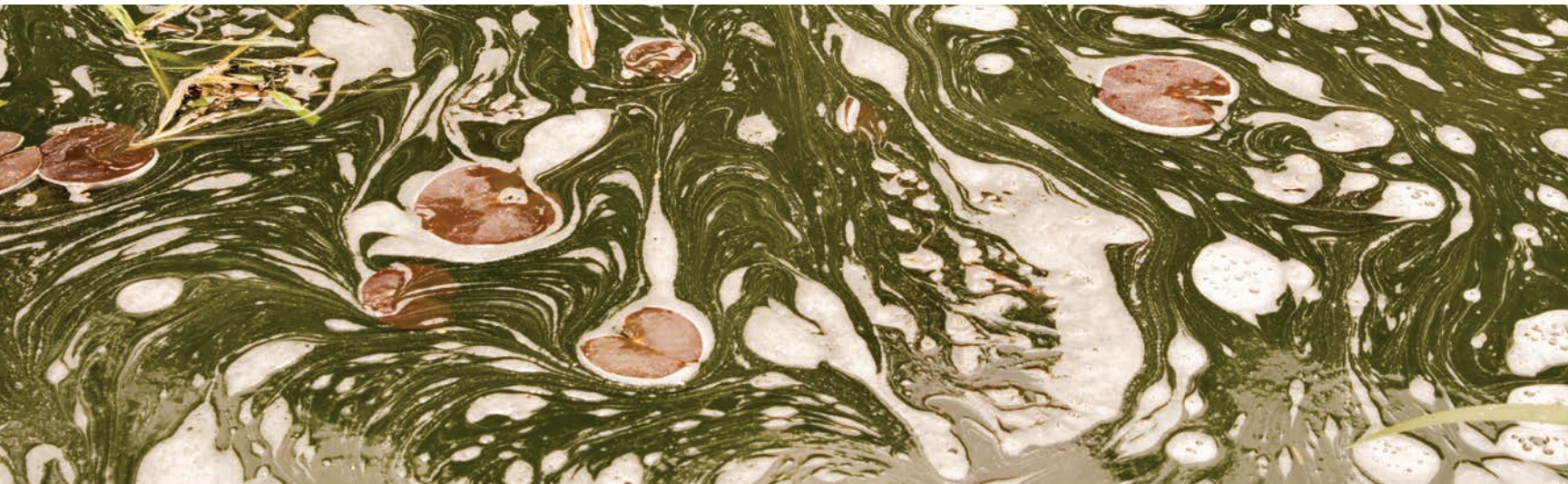
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Meet Dr. Erick Carreira at Booth 1303 to learn about these exciting new building blocks.

Some Scum! Microbe in Pond Scum Enlisted in New Cancer Test



Scientists are enlisting the living, self-propelled microbes found in pond scum—the pea-green surface slicks that form on ponds—in the development of a long-awaited new test to detect the cells that spread

cancer through the bloodstream from the original tumor to new sites in the body.

In a report here today at the 243rd National Meeting & Exposition of the American Chemical Society (ACS), the world's largest

scientific society, they described how the test is intended to not only identify the spreading of cells, but allow lab analysis of those cells so that doctors can decide on the most effective treatment.

Yoshinobu Baba, PhD, a

renowned scientist who led the research using the pond scum microbe called Euglena, also discussed promising results with new agents that can both produce images of diseased tissue and deliver treatments.

Baba's team turned to Euglena in

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an effort to solve the medical problem of detecting the minute number of cancer cells that break off from the original, or primary, tumor site and travel through the bloodstream. Those cells, termed circulating tumor cells (CTCs), enable cancer to spread, or metastasize, and start growing at distant sites in the body. Metastasis is the main reason why cancer can be such a difficult disease to treat. Detecting those cells would raise a red flag so that doctors could treat or more intensively monitor patients. Baba pointed out, however, that the small numbers of CTCs make that goal very difficult.

"In every 20 drops of blood, there are over 5 million white blood cells and 4 billion red blood cells, but there may be only one CTC," explained Baba, who is with Nagoya University in Japan. "It is very hard to separate such small numbers of CTCs from the huge numbers of blood cells. After separation, we must also get information about the CTCs, such as the DNA sequence. That DNA sequence can provide

further confirmation that that cancer has spread, lowering the risk of false alarms and perhaps help with decisions about treatment."

Baba's solution is a test that takes place in a lab-on-a-chip, a small device made up of microchambers and channels for the Euglena, which are single-celled organisms with features of both plants and animals. Historians think Euglena are the organisms that Dutch microscope pioneer Anton van Leeuwenhoek saw in 1674 in a sample of pond water. They have chlorophyll to produce food from sunlight, for instance, and also can ingest food. They have a primitive "eye" and a long tail or flagellum that moves like a whip to propel them through the water.

The scientists decided to use Euglena as a natural cargo carrier. Baba's team attaches an antibody onto the Euglena. That antibody can specifically bind to CTCs. The microbe (with antibody attached) is then placed into a microchamber

See **Pond Scum** page 12

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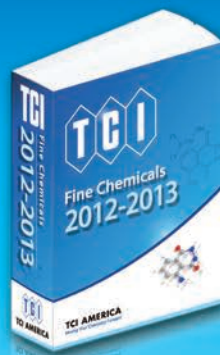
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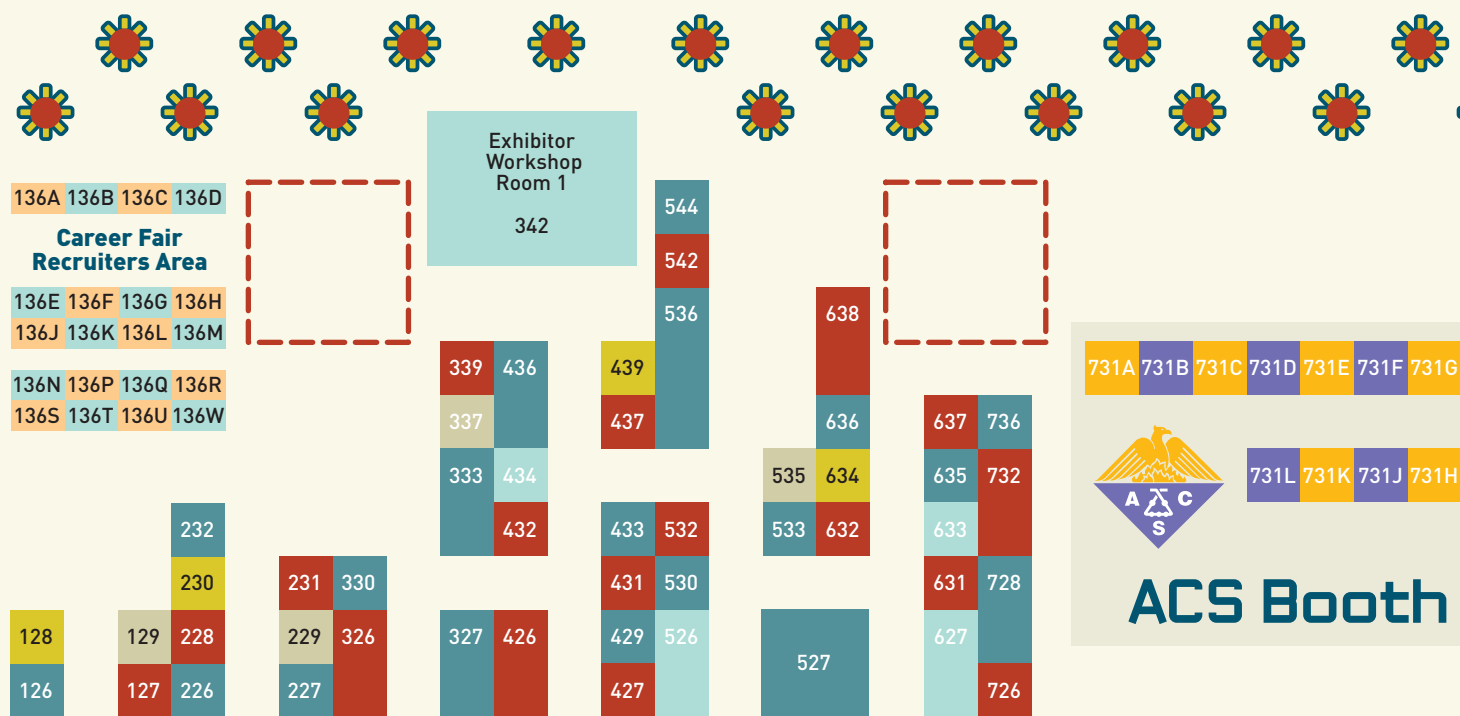
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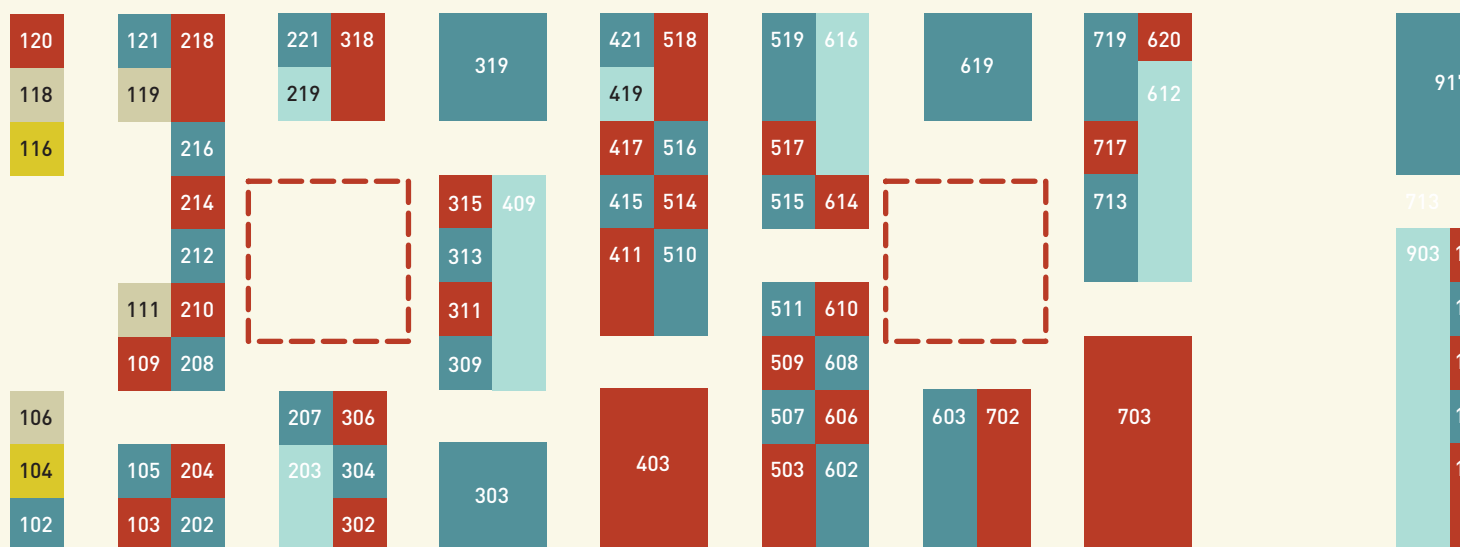
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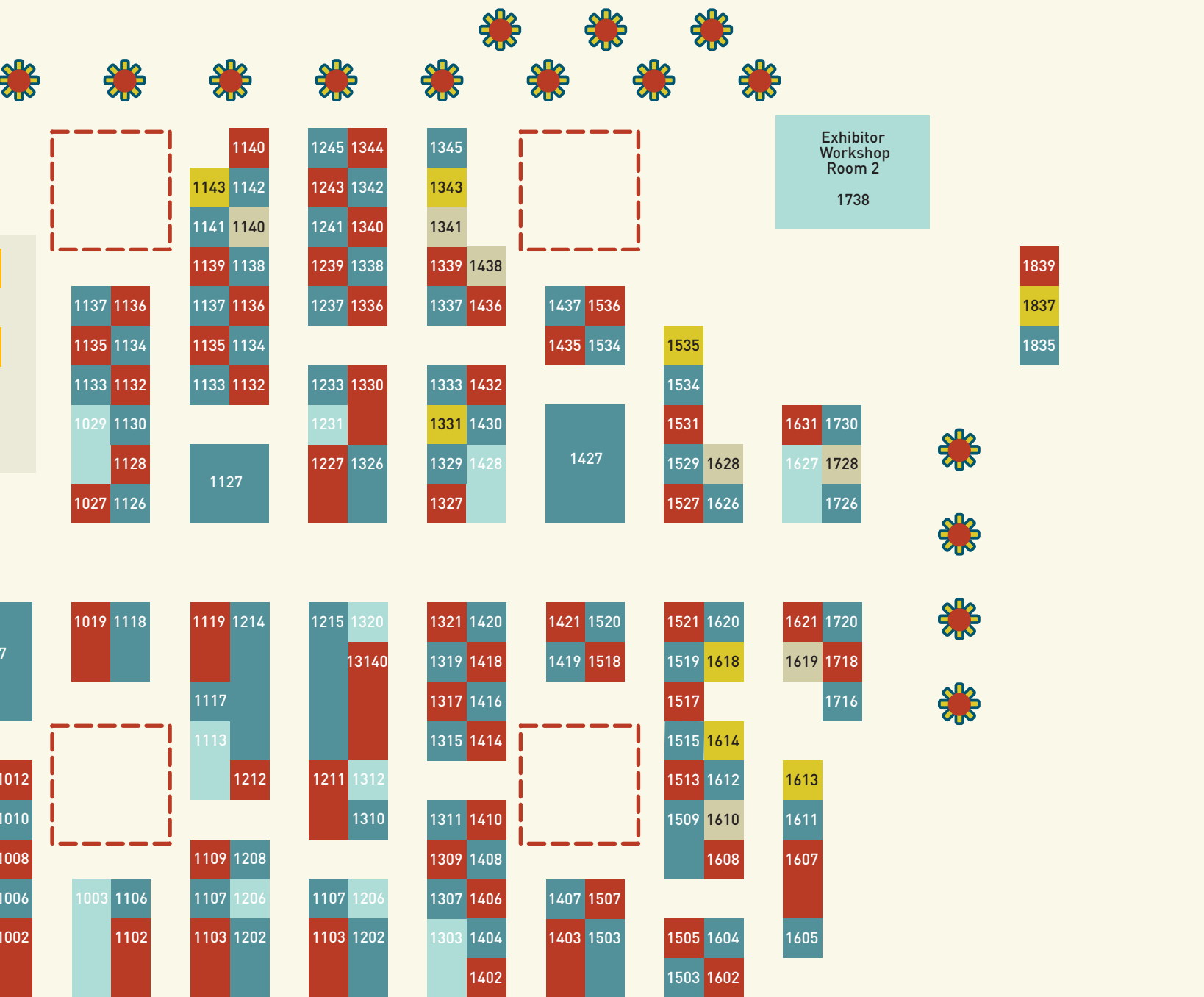


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- Galbraith Laboratories Inc., Booth 221
- Gamry Instruments, Booth 1521
- Gaussian, Booth 732
- Gelest, Inc., Booth 417
- Grace Davison Discovery Sciences, Booth 1211
- Hank Solutions, Booth 311
- Harrick Scientific, Booth 1517
- Harvard Apparatus, Booth 1035
- Heidolph USA, Booth 1326
- Hellma USA, Inc., Booth 1321
- Hidden Analytical Inc., Booth 415
- Hielscher USA, Inc., Booth 232
- Hirschmann, Inc., Booth 1513
- HOLD, Booth 228 & 1539
- HORIBA Scientific, Booth 1315
- i>clicker, Booth 1406
- Indofine Chemical Co., Booth 1126
- InfoChem GmbH, Booth 1033
- Innovative Technology, Booth 510
- Inspilorion AB, Booth 1519
- Intavis, Inc., Booth 1602
- Integrated Chemistry Design, Inc., Booth 1345
- Interchim Inc., Booth 315
- International Equipment Trading Ltd., Booth 105
- Ivium Technologies, Booth 1416
- J-KEM Scientific, Booth 1203
- JEOL USA, Inc., Booth 526



John Wiley & Sons, Inc., Booth 903
 JULABO, Booth 1329
 Kalexsyn, Inc., Booth 1212
 Kd Scientific, Booth 121
 Keck Graduate Institute, Booth 1612
 Knauer, Booth 1726
 KNF Neuberger, Booth 620
 KOREA KIYON, Booth 1337
 LAUDA-Brinkmann, LP, Booth 1133
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 NanoSight, Booth 1012
 Nat'l Res. Council/ Nat'l Academies, Booth 1404

Nature Publishing Group, Booth 1002
 Netzsch Instruments North America, LLC,
 Booth 1037
 NIST, Booth 203
 NOF America Corp., Booth 432
 Norton, Booth 1109
 NT-MDT Co., Booth 319
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 Oakwood Products Inc., Booth 1102
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 Olympus Innov-X, Booth 1611
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 picoSpin, LLC, Booth 1319
 PIKE Technologies, Booth 511
 Pine Research Instrumentation, Booth 1407
 PolyPeptide Group, Booth 1137
 Protein Technologies Inc., Booth 633
 QbD: HPLC Method Development and Optimization for
 Pharmaceutical Analysis Workshop, Booth 1839
 Qorpak, Booth 517
 Quark Glass, Booth 1207
 Rapp Polymere GMBH, Booth 1232

Reichert Technologies, Booth 214
 Remspec Corp., Booth 216
 Renishaw Inc., Booth 1607
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 Rigaku Americas Corp., Booth 427
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 Rod Griffin Australian Opals, Booth 1245
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 Strem Chemicals, Booth 519
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 Synquest Laboratories, Inc., Booth 1620
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 Titian Software, Booth 219
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 Tridiagonal Solutions Inc., Booth 1106
 University of Florida, Pharmaceutical Chemistry,
 Booth 1730
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 Vacuubrand, Inc., Booth 433
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 Vici Valco Instruments Co. Inc., Booth 434
 Vigor Gas Purification Technologies, Booth 227
 W.H. Freeman, Booth 1502
 Waters Corp., Booth 1302
 Wavefunction, Inc., Booth 627
 WebAssign, Booth 507
 Welch-Ilmvac, Booth 1720
 Wellcome Trust, Booth 1835
 Wilmad-LabGlass, Booth 1509
 Wyatt Technology Corp., Booth 602
 Yamazen Science, Inc., Booth 1402
 Zef Scientific, Inc., Booth 1128

From **Initiatives** page 5 and international leaders in science and education. From these meetings, the commission will develop recommendations to modify graduate education to successfully prepare students for their professional careers and to face changing human needs over the next 50 years.

ACS Presidential Working Group on Climate Science

Chemists are well-versed in the science underpinning their own specialties, such as developing new medicines, products to enhance food production, plastics and other materials that impact everyday life in positive ways. Many, however, may be less familiar with the intricacies of climate science, such as the number of gases (in addition to carbon dioxide) that can be greenhouse gases and, indeed, the fact that "greenhouse" is a misnomer for the actual mechanisms of global warming.

To equip chemists with a deeper

understanding of the science of climate change, the working group is developing a Web-based toolkit that explains the topic for use by ACS members to educate themselves. The American Chemical Society Climate Science Toolkit explains concepts, such as which gases are greenhouse gases, their sources, changes over time and other essential information.

"If, between now and the time I die, I don't succeed in having an intelligent conversation with my neighbor about evolution, that would be very sad," he said. "But if I don't succeed in having an intelligent conversation with my neighbor about climate change, the consequences later in the century could be catastrophic." Jerry A. Bell, a noted chemistry educator who is a faculty associate with the Wisconsin Initiative for Science Literacy at the University of Wisconsin-Madison, chairs the Climate Science Working Group. ♦

From **Pond Scum** page 9 that contains normal cells and a single CTC, simulating the very low concentration of CTCs that would be in a real cancer patient's blood sample. The antibody on the microbe binds to the cancer cell. When the researchers shine a light on the microchamber, the Euglena, with CTC in tow, moves to a neighboring microchamber to escape from the light. Afterwards, the CTC could be removed from the microbe and tested further.

They are working on improvements so that the test will reliably detect very small concentrations of CTCs in real blood samples. They plan to couple the microchamber to a so-called nanopore, which can sequence the CTC's DNA after the separation to positively confirm cancer metastasis.

Baba also is developing "theranostics," which combine therapy or treatment of disease with diagnostic imaging. One of Baba's theranostics involves therapeutic stem cells that are combined with imaging agents called "quan-

tum dots," which are semiconductor crystals that light up when exposed to a special type of light.

"One of the medical doctors in our university hospital injected stem cells into a mouse with liver failure, and the mouse improved," said Baba. "But he didn't know how this improvement happened. To determine the mechanism, we made a new type of quantum dot that would be placed inside the stem cells."

The new quantum dots are biocompatible and are safe for use with living cells, unlike many currently available versions. The quantum dots allowed the researchers to see where the therapeutic stem cells went after they were injected into a mouse.

Baba is now working with medical device companies to commercialize these new tools.

The scientists acknowledged funding from the Japan Society for the Promotion of Science (JSPS) through its Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program). ♦

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Finding a J.O.B.—Make the Most of Your Time

The ACS Career Fair here in San Diego offers a variety of programs to help you land a new job, build your job search skills, and learn about the many career pathways available to chemical professionals. Below are some tips to help you make the most of your time, ensure that you make a great impression, and take advantage of all the resources and programs on hand at the Career Fair.

Register for the Career Fair by logging on to www.acs.org/career-fair. Or, stop by the Career Fair's information booth onsite in Hall C.

General Tips

- Wear professional business attire and treat every appointment at the Career Fair as if it were an interview.
- Ask questions during workshops and live presentations.
- Be enthusiastic and assertive throughout the Career Fair.
- Log on to the Virtual Career Fair taking place Monday and Tuesday to review job opportunities in the

virtual employer booths.

Scheduling Tips

- Sign up early for a one-on-one personal career consultation—time slots are limited.
- Decide in advance the areas that you'd like to focus on before meeting with your ACS career consultant to make the most of your appointment.
- Review the workshop, webcast, and live presentation descriptions at www.acs.org/careerfair, selecting the ones you plan to attend.
- Plan to attend ACS Career Pathways if you're new to the job market or considering a career change. This innovative program will help you choose a career path that suits your talents, goals, and personality.

Networking Tips

- Talk to the recruiters in Recruiters Row to learn about working for

their organizations and the job opportunities they offer.

- Get contact information from everyone who might be a prospective employer or could help you in your job search.
- Give contact information to everyone who might be a prospective employer or could help you in your job search.
- Network and talk to others while waiting in line.
- Talk to a broad range of employers to explore a variety of career and job options.
- Work the exhibition hall. Some of the exhibitors could be prospective employers or know of job openings that are right for you.

Interview Tips

- Arrive at least 10 minutes early to all interviews to ensure you're always on time.
- Log on to your ACS Careers Jobs Database account (chemistryjobs.acs.org/jobseekers) regularly for

last-minute appointments. The Career Fair offers easy access to computers to check appointments and communicate with recruiters.

- Research potential employers prior to your interview or meeting (even if you're just strolling Recruiters Row).
- Present your qualifications honestly.
- Shake hands and introduce yourself to recruiters and thank them for their time and the opportunity to meet.
- Prepare yourself to respond to typical interview questions:
 - What do you offer a prospective employer?
 - What makes you exceptional?
 - What are your research achievements and goals?
 - Where do you see yourself in five years?
 - Why do you want to work for our organization?

Visit **Career Fair** in **Hall C**. ♦

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ACS Career Pathways: Discover the Career of Your Lifetime

ACS Career Pathways is a carefully designed, innovative program that enables you to choose a career pathway in the chemical sciences that's right for you. It's taking place and available here in San Diego at the ACS Career Fair. All ACS members who are looking to start their careers or make a career transition are invited to participate in ACS Career Pathways.

If you're unable to participate in San Diego, it will be available at the next ACS National Meeting in Philadelphia.

The program is divided into three phases, starting off with an introductory half-day workshop where you'll learn about the four main career pathway options available to chemical professionals. At the same time, you'll also assess your own talents, personality, and goals in order to see which of these pathways makes the most sense for you.

The second phase involves

choosing from among four workshops to continue exploring and developing your own personal career pathway:

Careers in Higher Education

Discover the pros and cons of a career in academia. Learn about typical careers within the four main types of academic institutions. Among the topics covered are the expectations placed on you to bring in grants and other funding. Explore what you can expect during your first year in academia and what you can do during that year to lay the foundation for success.

Careers in Industry

Among the varied career options in industry for chemical professionals, learn about bench scientists and chemists who work in management, patent law, regulatory affairs, technology transfer, technical communications, and information

science. Discover the best ways to find jobs in industry, manage the recruitment process, and negotiate job offers.

Careers in Government

Find out if a career in government is right for you. Learn about the different types of federal, state, and local government agencies as well as the types of jobs for chemists within these agencies. Panelists will describe the often complex ins and outs of the government hiring process—helping you sail through all the red tape.

Working for Yourself

Consider a career as an entrepreneur or consultant. Hear about all the advantages and disadvantages of being your own boss, helping you decide whether this is the right choice for you. Panelists will go through the day-to-day details of running your own business, including hiring

and managing employees.

The third phase of the ACS Career Pathways program is called Acing the Interview. It addresses the fundamentals of successful interviewing, explaining the key differences in interviewing for different types of hiring organizations. At the end of this workshop, you'll participate in two or three quick mock interviews. With the facilitator's feedback, you'll incorporate what you've learned to ace your next interview and begin your new career.

ACS Career Pathways is ideal for students and young professionals who are beginning their careers. It's also perfect for chemical professionals in mid- or late career who are contemplating a career change or launching their own entrepreneurial ventures.

Stop by the information desk in Hall C at the ACS Career Fair for an updated schedule. ♦

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EXHIBITOR WORKSHOPS

Exhibiting companies are hosting free education sessions this week for attendees that will introduce new products and services, build skills with specific tools and techniques, and highlight innovative applications for existing instrumentation. Exhibitor workshops are intensive, up to 2.5 hour sessions held in the Exposition Halls, A-B and in private rooms at the San Diego Convention Center. Register onsite by visiting the respective exhibitor booth inside the ACS National Exposition, San Diego Convention Center, Halls A-B.

MONDAY

Advanced Polymer Characterization Workshop

Sponsor: Tosoh Bioscience, Booth 516

Meeting: Room 1, 8:30–11 am

GPC, light scattering, viscometry, and beyond—explore solutions to the challenges of characterizing today's sophisticated polymer formulations. Experts show how to obtain the data needed to control and understand polymeric properties such as elongation, tensile strength, adhesion, and compositional drift.

Reaxys: Maximizing Your Chemistry Research Workflow

Sponsor: Elsevier, Booth 1019

Meeting: Room 1, noon–2:30 pm

Learn how researchers are using Reaxys to reduce the time they spend looking for chemical reaction and compound data. Reaxys gives researchers immediate access to relevant results, reducing the need to spend unnecessary time in the lab. Discover more about the latest enhancements from Reaxys, including how the most recent development, Reaxys Xcelerate, will help

researchers spend less time searching and more time discovering.

Protect Your Assets—Risk Management Issues Affecting Consultants, Small Business Owners

Sponsor: ACS Member Insurance Program, Booth 731

Meeting: Room 1, 3:30–6 pm

Sponsored by the Board of Trustees, Group Insurance Plans for ACS members and co-sponsored by the Division of Business Development and Management (BMGT) and Division of Small Chemical Businesses (SCHB). Whether you consult occasionally or full-time or are just beginning to think about a future consulting career, this free workshop offers practical information from which all consultants can benefit.

Dynamic Microscopy Techniques for Chemistry and Catalysts

Sponsor: FEI, Booth 333

Meeting: Room 2, noon–2:30 pm

Today's scientists are making efforts to resolve global challenges through increased understanding of chemical reactions and catalysts as part of the development of novel materials. They are using electron microscopy to collect images and compositional data at the nanoscale; however, electron microscopy can provide more than just static observations and high resolution material characterization. Applications from FEI's unique class of Dynamic Microscopy solutions, Environmental Transmission Electron Microscope (ETEM), and the Environmental Scanning Electron Microscope (ESEM) are solutions that enable sample experiments to be conducted in situ, with results observed in real time and recorded as movie files. ♦

Meet Dr. Robert S. Langer

Dr. Robert S. Langer, the David H. Koch Institute Professor at MIT, 2006 U.S. National Medal of Science winner, 2008 Millennium Prize recipient, and the 2012 Priestley Medal winner, will be signing copies of C&EN at the ACS Spring National Meeting in San Diego. Dr. Langer has authored more than 1,100 research papers, has approximately 800 issued and pending patents worldwide that have been licensed or sublicensed to more than 220 companies, and has had a hand in creating some 25 companies. Dr. Langer is being awarded the Priestley Medal in recognition of cutting-edge research that helped create the controlled-release drug industry and the field of tissue engineering. He will be featured on the cover of the March 26, 2012, issue of C&EN.



Tuesday, March 27, 2012
11:00 a.m. to Noon
ACS Booth

C&EN

ACS Spring National
Meeting & Exposition
San Diego, CA

Five Minutes With...



Name: Gary D. Allred

Title: President

Company: Synthonex

What are your major concerns within your market over the next two years?

The continuing decline of domestic jobs due to overseas outsourcing is the biggest problem we face. Over the past 10 years pharmaceutical companies have more than doubled their expenses with mergers, acquisitions, and outsourcing. At the same time nearly one quarter million domestic chemistry jobs have been eliminated. The result? Empty pipelines, lost IP, poor quality, and fewer drugs. When U.S. jobs are lost, the demand for U.S.-produced goods that support those jobs likewise declines. As more and more chemists are unable to find work, many are starting their own companies with the hope of selling chemicals they know how to produce to the pharmaceutical industry. As new suppliers enter a shrinking market, increased competition results. To stay competitive many suppliers operate with low overhead and poor quality controls, thus further damaging the industry.

Among the challenges the industry faces, which do you think are the most pressing?

First, unfair trade practices and currency valuations have lead to a steady stream of job and technology exports. Although most companies are resistant to outsource their core competency, it oftentimes becomes a situation where they feel the need to do so in order to stay competitive.

A second challenge that has more recently developed is that many ►

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pharmaceutical companies are now becoming more dependent upon academic research. In fact, many companies now have entire programs devoted to the evaluation of university-generated intellectual property. This is advantageous to pharmaceutical companies because once a university has filed a patent, the pharmaceutical company has the opportunity to evaluate the technology at basically no cost. Viable technology is often acquired at great reward to the university. This, in turn, has incentivized universities to increase their research programs and recruit more chemistry students. Unfortunately, many students are now finding that upon graduation their careers are essentially over.

And what do you believe are the most creative solutions?

The problem of unfair trade practices must be addressed by our elected officials. Until this is adequately dealt with, the industry is unlikely to change.

What should be the common goals within the industry and/or marketplace?

It would be nice to see a cooperative commitment within the industry toward retaining jobs and technology in the U.S. This would be an effective way to address unfair trade practices without government intervention.

What is one relevant question (and your answer) that you believe no one is addressing adequately?

What will be the largest growth area for chemistry in the near future and what industry should universities be training chemistry students to enter? Energy and materials will likely expand rapidly in the near future. Despite numerous advances, medicinal chemistry remains a "shot in the dark" and thus requires a labor-intensive workforce. This will tend to keep the greatest potential for innovative chemistry in the field of alternative energy, energy storage, and related materials. ♦



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KNF Lab Intros Wireless Vacuum Pump System With More Power

KNF Lab introduces the SC950 vacuum pump system with wireless remote control. This vacuum system features powerful 50 LPM pumping speed and 1.5 Torr end vacuum for shorter processing time with a wide range of solvents. Because the pumping speed is completely adjustable, flask sizes up to 20L can be accommodated, while the precision sensing system prevents bumping.

This new system combines KNF's latest diaphragm pump technology with a smart electronic control and efficient motor, saving labs time, energy, money, while protecting the environment.

Today's researchers are looking for vacuum systems characterized by reliable, deep vacuum performance, for use in a wide variety of applications, high flow capacities, shorter process times, precise pressure control, accurate, repeatable results, and clean, quiet, and efficient operation. Also

important are environmentally friendly products without sacrificing performance. All of these requirements are now met by new products using a sophisticated, patented pump diaphragm and valve technology.

The heart of the system is a newly developed, four-stage diaphragm pump.

Patented diaphragm technology ensures high pneumatic pumping capacity in a small package with minimal operating noise level. All components of the vacuum pump system that come into contact with media are made of chemically-resistant materials for a long trouble-free life. In addition to being extremely quiet, the pump's performance is precisely controlled by advanced internal electronics.

Precision microprocessor electronics provides four operating modes to ensure the flexibility in a range of laboratory applications;



vessel evacuation at variable pump speed, constant pressure control, automatic vapor pressure determination and it is capable of following a user-programmed pressure curve. Are all controlled from the handheld remote terminal or via a USB PC control interface.

The pump is driven by a speed-controlled DC motor for low energy consumption. Accepting a universal range of power from 100V to 240V at 50Hz to 60Hz, the system is tolerant of power fluctuations. The unit converts incoming voltages into the DC voltage for the drive motor, while motor speed is constantly adjusted by internal control electronics.

Conserve valuable laboratory space by positioning the system in remote locations such as within a cabinet or on a shelf. No need to open the sash when the SC950 is placed inside a fume hood, the wireless remote allows the operator complete control, and provides added safety and HVAC energy savings.

An inlet separator and liquid-cooled outlet condenser are included, the SC950 to recover solvent, which keeps the lab atmosphere clean.

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Biosensing Instrument Offers Hands-free Operation



Biosensing Instrument has introduced the BI-4000 SPR instrument featuring autonomous sample preparation and delivery for convenient hands-free operation. Equipped with BI-DirectFlow technology for near-zero sample dispersion and fast kinetic studies, it provides temperature controlled SPR detection for thermodynamic studies.

The BI-4000 offers a very wide dynamic range, high sensitivity, and broad response time for detection of small and large molecules. With single and serial fluidic modes, its EC-SPR option provides the capability of flow injection electrochemical SPR analysis.

Visit **Biosensing Instrument** at **Booth 608**. ◆

MBraun Features Range of Solvent Drying Options



Laboratories that are currently working with synthesis require efficient methods with which to dry organic solvents. Many of these methods use highly reactive metals or metal hydrides, which increases the risk of fires and/or explosions in the laboratory. This risk most often occurs when hot solvents that are present during the distillation process which removes the solvent from the desiccant spontaneously ignites.

A non-explosive solution that is quickly gaining popularity in the lab often dries solvent utilizing exchangeable filter cartridges filled with drying material. The solvent drying systems are equipped with many new and improved safety items that include solvent storage

cabinets, over pressure valves, color coded solvent lines, and fume hoods to extract harmful solvent vapor away from the user.

Although some labs have been reluctant to adopt this new technology because of capital cost and user history, many groups find these systems invaluable to their research needs.

MBraun offers a wide range of solvent purification system configurations that can meet both limited budget and application specification. The MB-SPS effective, efficient, and safe option for drying solvents by absorbing water utilizing filter media like alumina or molecular sieves.

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ACD/Percepta Platform Provides Numerous Tools

The words "lead optimization" usually conjure up images of chemists in a laboratory busily collecting reagents and glassware to begin synthesis of series of compounds. While this scenario holds true, there are many that start this work not in a fume hood, but on a computer.

Computational chemists have multitudes of software applications to help them manipulate compounds; but few, if any, have been designed for use by synthetic chemists. Those that do exist are generally home-made by organizations that have the time and resources to dedicate to this type of project.

The new **ACD/Percepta** platform provides a number of tools designed for synthetic chemists.

The new generation software builds upon almost two decades of experience and expertise in property prediction algorithms, and brings ADME-Tox and PhysChem prediction together in one interface. Predicted properties include pK_a , $\log D$, aqueous solubility, oral bio-availability, P-gp specificity, blood brain barrier penetration, and hERG inhibition. From a number of products with different levels of detail, synthetic chemists can learn more about their compounds and help direct synthesis to work smarter.

The full property profile of a compound can help quickly identify liabilities. Before setting out to create a library of analogs, profiling one or 10 of the compounds selected

for synthesis can help focus efforts on those most likely to meet requirements.

Results may be viewed in a spreadsheet with various tools available to help analyse and rank analogs. User-defined color-coded thresholds help quickly visualize results, and the ability to import other data provides one place for analog evaluation.

While experience and intuition go a long way to help solve problems, scientists are limited by their own experience and that of colleagues. Investigate the available chemical space that can help build molecules with the property profile you need. Simply input a structure, indicate the portion(s) of

the molecule for modification and input the ideal ADME and physico-chemical profile. The software will automatically generate analogs with an improved property profile.

With prediction modules that can be used by computational groups to train datasets with experimental data and investigate structure-property relationships in detail, Percepta offers the convenience for different groups to work within the same platform. Flexible licensing and deployment options mean that predictions can be delivered at individual desktops, plugged into your own prediction engine, or made available via your intranet.

Visit **ACD/Percepta** at **Booth 1208**. ◆

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