The Next Small Thing

Kristen Kulinowski brings passion to nanotechnology education and advocacy.

The nano realm may be tiny, but the reality of nanotechnology in our lives makes for a big job. Just ask Kristen Kulinowski, the executive director for education and public policy at the Center for Biological and Environmental Nanotechnology at Rice University (Houston, TX).

“It unites my two passions, which are education and policy,” says Kulinowski. The two often overlap as she works to educate both the general public and U.S. policymakers about the often-misunderstood area of nanotechnology.

Nanotechnology Education

“I spend about half my time designing and implementing programs to inform people from about the sixth grade up through the adult learner about what nanotechnology is and how it might impact human health and the environment,” Kulinowski says. Rice University conducts science and engineering outreach programs for middle school, high school, and undergraduate students, as well as teacher training programs.

“We use nanotech as a means, not an end, to achieve science literacy,” she says. “We use it as a hook to get people excited. You get them excited about one aspect of science and then hopefully they’ll be more receptive to science and engineering in general.”

This excitement began early for Kulinowski. In grade school she aspired to be a heart surgeon, and although that dream did not last, her love of science and math did. She earned a BS magna cum laude in chemistry from Canisius College (Buffalo, NY), a Jesuit college that encouraged service to community and a liberal arts education, where she fell in love with the academic setting. “I wanted to be in college forever,” she says.

Her penchant for policy matters came after graduate school when a friend encouraged her to apply for the SPIE-O S A Congressional Fellowship Program. Kulinowski became the 2001–2002 Fellow and says the experience “meshed because I view policy as a way of doing service, and as a way of being more interested in science. Policy is a way to have more impact in a larger national, and increasingly international, theater especially. I still wanted to be exposed to the people who were active in science even if I wasn’t doing it myself.”

Responsible Nanotech

Today Kulinowski advocates responsible and sustainable nanotechnology and seeks to educate legislators about nanotech.

“We’re trying to change the way emerging technologies are assessed,” she says. “Right now we have a model where we wait for something bad to happen and then we try to fix it. With nanotechnology, since we’re so early in its trajectory and there are so few products out on the market, we can be doing risk assessment on promising nanomaterials that look like they might make it into commerce before they make it into commerce.”

“The power of nanotechnology is really in engineering the exact properties you want. We believe that with enough foresight we can engineer in the properties that we want and engineer out the unintended impact.”

Another aspect of policy is public perception. A positive model for public acceptance of emerging science is the Human Genome Project. “The genome project recognized that there might be some ethical, legal, and social implications associated with mapping the human genome,” Kulinowski explains. “They recognized from the outset that this could be a concern, and they built into their program funding for ethical, legal, and social implications research. There hasn’t been an overwhelming backlash against mapping of the human genome, and that suggests to us that it is better to confront the issues head on.”

In this effort, she says they have been successful in getting federal agencies, such as the National Toxicology Program (Research Triangle Park, NC) and the National Institute for Occupational Safety and Health (Washington, D.C.) to study nanomaterials.

Kulinowski is amazed at how far nanotechnology and gov-
ernment reaction have come in the last few years. She has gone from tackling panic about nanobots to organizing nanotechnology nomenclature and standards workshops for legislators. “A year and a half ago, it was issue raising, now the emphasis is shifting toward what policies and programs should be in place,” she says. “It’s been really gratifying to see the community that’s building around this issue.”

**Women in Optics**

Responsible nanotechnology isn’t the only issue Kulinowski advocates; she also chairs the SPIE Women in Optics (WiO) technical group. “It’s still a new concept, and in a highly technical field like optics and photonics, it’s important for women to support one another and have role models,” she says.

With the SPIE 50th anniversary rapidly approaching, Kulinowski says the WiO group plans to celebrate the occasion with a calendar honoring women in science throughout history. “We’d like to highlight the special role that women have played and the contributions they’ve made, because I think they’re many and numerous.”

The group holds luncheons and special events at SPIE meetings throughout the year, such as the recent panel titled “Colorado Women in Optics: From Industry to Academia” at the 49th Annual Meeting in Denver, CO.

“I would like to see the participation in Women in Optics actually reflect the level of women in optics,” says Kulinowski. “WiO is all about getting people together with common interests for fun, fellowship, education—to show those in training that it’s possible to have a career and family, and to show them positive role models of women who have gone on to be very successful. There are some wonderful women in the Society who are doing amazing things.”

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**Election Results for 2005 Officers and Directors**

SPIE President James W. Bilbro announced the SPIE 2004 election results at the Society’s Annual General Meeting. Term of office begins 1 January 2005.

**Officers elected for the 2005 term:**

**President:** Malgorzata Kujawinska, Warsaw University of Technology, Poland

**Vice-President:** Paul F. McManamon, Air Force Research Laboratory, USA

**Secretary:** Brian Culshaw, University of Strathclyde, UK

**Treasurer:** Robert E. Fischer, Optics 1, USA

**Directors elected for the three-year 2005-2007 term:**

Thomas J. Glynn, National University of Ireland-Galway, Ireland

Christopher J. Progler, Photronics Inc., USA

H. Philip Stahl, NASA Marshall Space Flight Center, USA

Katarina Svanberg, Lund University Hospital, Sweden

Seung-Han Park, Yonsei University, South Korea

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**MEMBER NEWS AND ANNOUNCEMENTS**

Christopher J. Progler, Photronics Inc., USA

H. Philip Stahl, NASA Marshall Space Flight Center, USA

Katarina Svanberg, Lund University Hospital, Sweden

Seung-Han Park, Yonsei University, South Korea
President's Report

At the 2004 SPIE Annual General Meeting, James W. Bilbro reported that he has focused on the international aspects of the Society and students in 2004. International Presidential Advisory Committees were formed this year to make regional operating recommendations and to evaluate SPIE’s structure.

Bilbro shared highlights from SPIE meetings that he attended in 2004, including SPIE’s first broad-subject European meeting, Photonics Europe (Strasbourg, France). The strong technical meeting was well received and the concept of an Innovation Village, which encourages students and others to demonstrate innovative ideas, was introduced.

The presidential trip to Europe focused on countries that SPIE leadership has not visited in recent years. Meetings were held with several high-level individuals from industry and academia, and a range of Society issues were discussed, including U.S. visa delays. SPIE leadership met with Optical Society of America President Peter Knight in Europe and discussed possible opportunities to work together. The trip included a visit to the Royal Observatory in Edinburgh, UK, a meeting with Institute of Physics (London, UK) leaders, and a tour of next-generation lithography systems being developed in the Netherlands.

They also visited the Bulgarian Chapter, which was celebrating its 10th anniversary, and Romanian Regional and Student Chapters. Bilbro reported they were doing a wonderful job under challenging circumstances. In Spain, meetings were held with the Spanish Optical Society, the Spanish Space Agency, and several companies.

Executive Director's Report

SPIE Executive Director Eugene Arthurs provided an overview of Society revenue, expenses, and net surplus over the last decade. The Society maintained a healthy surplus during that period, partially due to cost reduction efforts by staff and volunteers and a cautious investment approach. The Society is expecting a smaller surplus in 2004 as it invests in upgrading its infrastructure.

A 10-year comparison of revenue by activity was presented that reflected significant growth in exhibition revenue. Publications revenue and expenses are moving closer together, and conferences and education currently have greater expenses than revenue.

Ten-year comparisons of meeting attendees, including geographic distribution, employment breakdown, and membership type, were presented. Arthurs said there has been a heavy emphasis on students in the last few years.

A slate of upcoming SPIE meetings was presented. There are approximately 30 chapter meetings scheduled in 2004 that will be run by SPIE chapters.

Members can request the full minutes of this meeting. Contact Bobbie Lively at 360-676-3290 ext. 254, or e-mail her at bobbie@spie.org.

The next meeting of the corporation will occur in conjunction with Optics and Photonics 2005, the SPIE 50th Annual Meeting, scheduled for 2-7 August 2005 in San Diego, CA.

Treasurer's Report

SPIE Treasurer Robert E. Fischer reported that the financial condition of the Society remained strong through 2003 and into 2004 (see financial statement at right). As of 31 December 2003 the Society's cash and investments increased 23% over the year-end 2002 balance. Year-end results were well above the budgeted figures, including liquid reserves equal to 9.16 months of budgeted expenses, compared to the board-mandated minimum of six months and a year-end forecast of 9.60 months.

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<td>Net Assets</td>
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Highlights include tales of a presidential tour and details of SPIE’s fiscal strengths.
Student Leaders Converge at SPIE Annual Meeting

SPIE student chapter leaders met for a day of leadership orientation at the SPIE 49th Annual Meeting in Denver, CO, this August. A record 64 students attended the orientation, representing 11 countries: Argentina, Canada, China, Ireland, Mexico, Poland, Romania, Russia, Ukraine, the United Kingdom, and the United States.

The day was full of information about SPIE, student chapters, and life after graduation. The students heard Dale Gaddy of Association Team Inc. (Fairfax, VA) talk about “Building a Strong Student Chapter.” The morning workshop was geared toward helping students develop a plan of action to organize and launch into the next school year.

After lunch, SPIE President Jim Bilbro welcomed the students to the conference and expressed his appreciation and encouragement. During the afternoon, Leo Irakliotis from the University of Chicago (Chicago, IL) shared his unique perspective as a former student chapter member who is now a professional active within the Society.

“He said a lot of things that were very useful. I think Leo gave a really good introduction, especially for students who haven't attended a conference or been involved as much,” says Brent Bergner of the University of North Carolina, Charlotte (UNC). The UNC Student Chapter was just approved this year. Bergner is studying metrology for micro-optics and diffractive optics at UNC.

The students also received an overview on existing and new student chapter benefits. The final activity of the day was building a “blinkie.” Each student used his or her engineering skills to assemble a flashing LED creation.

Vesselin Shaoulov attended the meeting, representing the University of Central Florida chapter in Orlando. His research spans different areas in optics, including micro-optical systems and augmented reality such as head-mounted displays. Shaoulov said the speakers at the meeting were very motivational, and that he would pass on their comments to his student chapter.

Students stayed for the week of the conference to attend the technical program and to continue networking with fellow students. In addition, many students presented papers at the symposium.

The consensus among students was on the high value of the networking they accomplished during the day and throughout the week. “Talking with other students about programs like K-12 education—that was the most valuable thing,” says Bergner.

Olha V. Malinochka, vice-president of the Vinnitsa National Technical University Student Chapter (Vinnitsa, Ukraine), says she also benefited from communicating with other chapters. There was one student from each of the five Ukrainian student chapters at the meeting.

“By the third day of the conference the students were hanging out with each other as though they were old colleagues already,” says Gretchen Gerish, SPIE student services coordinator. “It wasn't uncommon to see students from Mexico, the U.S., the UK, and Poland sharing lunch and comments about the conferences they had attended.”
Asia-Pacific Region Hosts Trio of Photonics Events

Photonics, communications, and remote sensing developments in the Asia-Pacific region of the world are the focus of a trio of upcoming SPIE events in November. APOC 2004 (Asia-Pacific Optical Communications), Photonics Asia, and the Fourth International Asia-Pacific Environmental Remote Sensing Symposium: Remote Sensing of the Atmosphere, Ocean, Environment, and Space will each highlight distinct areas of optics and photonics in the Asia-Pacific region through technical programs and exhibitions.

Photonics Asia, 8–12 November, and APOC, 7–11 November, will be colocated in Beijing, China. Photonics Asia, cosponsored by the Chinese Optical Society (COS), is the fourth in a series of events focused on current research in a wide range of photonics-based technologies and applications. Topics covered at this symposium will include high-power and semiconductor lasers, biomedical optics, quantum optics, nanotechnology, electronic imaging, IR technologies, microelectromechanical systems and micro-opto-electromechanical systems, optical data storage, and microlithography.

With many Asian countries making the move from microelectronics to photonics-based technologies, the market for photonics in Asia is rapidly expanding. Thus, market analysis and business and investment opportunities will be a vital component of Photonics Asia.

Meanwhile, telecom and information technology systems and services will be the focus of the technical program at APOC, which is cosponsored by COS and the China Institute of Communications (Beijing, China). The four key topics at APOC will be passive components and fiber-based devices; semiconductor and organic optoelectronic materials and devices; transmission, switching, and subsystems; and network architectures, management, and applications.

Also featured at APOC will be a full-day Industry Forum Program, which will center on an in-depth discussion of the current status and future direction of China’s telecom market, including trends in technologies and applications.

The Fourth International Asia-Pacific Environmental Remote Sensing Symposium will be held 8–12 November in Honolulu, HI. Past symposia have been located in China and Japan, but this year the symposium will be held for the first time in the United States.

The emphasis will be on the broader international cooperation needed to solve environmental problems. Scientists, engineers, and policymakers from around the world will meet to share recent developments in remote sensing and discuss how applications can benefit the global community.

For more information on any of these symposia, please visit spie.org/conferences.

Teachers Make an Impact with Light

The first Hands-On Optics (HOO): Making an Impact with Light teacher training session was held in July at the University of Southern California (Los Angeles, CA). More than 30 teachers and optics resource agents participated in the three-day training workshop.

The group prepared to implement the first three HOO learning modules this fall. The modules aim to teach students about lasers and reflection, multiple-plane mirror systems using homemade kaleidoscopes, and properties of lenses while making refracting telescopes.

HOO is a three-year collaborative optics education program funded by a National Science Foundation grant and organized by SPIE, the Optical Society of America, MESA (Mathematics, Engineering, Science Achievement Program), and the National Optical Astronomy Observatory. The program is designed to reach underrepresented U.S. middle school students.

ICO NEWS

ICO newsletter October 2004, No. 61

* 20th Congress of the International Commission for Optics, “Challenging Optics in Science & Technology” Second Announcement and Call for Papers


* A School of Lasers in Morocco

* News from ICO Territorial Committees: Activities of the USAC-ICO Committee

* Forthcoming events with ICO participation

Please visit www.ico-optics.org for a full version of the newsletter.