PHOTON2 NEWS

A Project of the New England Board of Higher Education (NEBHE)

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PHOTON is a project of the New England Board of Higher Education (NEBHE), and is funded in part by the Advanced Technology Education (ATE) program of the National Science Foundation (NSF). For more information, please visit our web site: www.nebhe.org/photon.html. You may also contact the program staff at NEBHE:

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NEBHE Selects PHOTON2 Participants

After a national recruitment effort, the New England Board of Higher Education (NEBHE) has selected the colleges and partner high schools that will participate in the first of two cohorts in Project PHOTON2. Faculty and career counselors from each institution will participate in a number of different learning experiences over the next two years. First, each PHOTON2 education alliance, composed of faculty and counselors from several geographically proximate institutions, attended two-day introductory workshops in the spring of 2004. Next, they will take a one-semester, four-credit professional development course, "Introduction to Photonics," via distance learning. The course is offered by Three Rivers Community College, in Norwich, Conn. During the summer of 2005, faculty and counselors will participate in a two-week externship at a local company or lab to gain a better understanding of how optics/photonics technology is applied in industry or research labs. As a capstone to its participation in PHOTON2, each alliance will present its implementation activities at a final showcase workshop in the spring of 2006.

In March 2004, PHOTON2 began recruiting teachers and counselors for the project's second cohort. Applications are due May 28, 2004, and may be downloaded from www.nebhe.org/photon2.html. The second cohort schools will have their introductory workshops in the fall of 2004 and the course will be offered in the spring semester of 2005.

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PHOTON2 PIs Disseminate at Professional Meetings

Education & Training in Optics & Photonics (ETOP)

ETOP is a bi-annual conference dedicated to optics and photonics education on an international, in-depth basis. The international conference, a partnership among photonics/optics professional/industry societies, includes the support of the Optical Society of America (OSA), International Commission on Optics (ICO) and the International Society of Optical Engineering (SPIE).

ETOP 2003, from left: PHOTON2 Co-PIs Nick Massa and Judy Donnelly with National Advisory Committee member Robert Breault of Breault Research Organization, Inc.

The 2003 conference, held in Tucson, Ariz., in October, was held with OSA's Frontiers in Optics/Laser Science XIX conference. The conference brought together 1,163 optics and photonics industry experts plus 126 leading optics and photonics educators and training personnel.

Co-Principal Investigator Barbara Washburn delivered a paper: "The Light Fantastic: PHOTON Materials for Technician Education."

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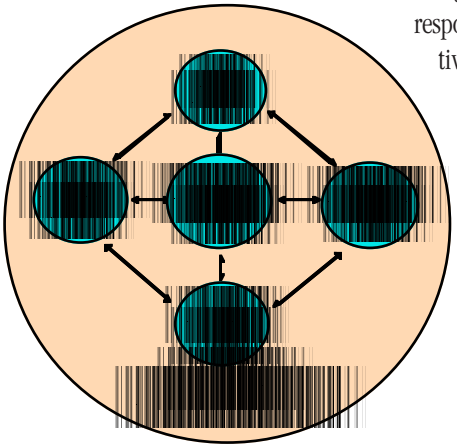
Adult Learning Principles: A Key to PHOTON2

Project PHOTON2's predecessor PHOTON was a highly successful program in teacher professional development in the field of photonics technology education. In an effort to replicate project PHOTON on a national level, PHOTON2 was conceived as a web-based approach for teacher professional development. This approach, however, posed a unique challenge: in addition to the technological challenges of developing and teaching a laboratory-based photonics course online, there remains the basic question of how to teach adults via the Internet. PHOTON2 is therefore an experiment in adult professional development utilizing an online instructional environment.

In developing an effective model for adult professional development, however, we are not without guidance. Over the past 30 years, adult learning has emerged as a separate and distinct field of study, distinguished by the special needs and characteristics of adult learners.

While a number of theories, models and frameworks have been proposed, there is still no single, accepted unifying theory of adult learning. Researchers, however, have identified a number of distinct characteristics of adult learning that have proven useful to educators developing adult learning programs:



A schematic of the interplay of adult learning principles in a supportive learning environment.

- *Self-direction*: Compared with children, adults prefer to work more independently and with less supervision. They can nevertheless thrive in interdependent, connected and collaborative ways so long as their autonomy is respected.
- *Experience*: Adults bring a rich background of life experiences to the classroom. They learn best when new knowledge builds on this history.
- *Goals*: Adults are much more goal-oriented than children, and enter educational programs looking to fulfill specific objectives.
- *Relevance*: Adults are less likely than children to continue in an educational program that appears to have little relevance to their needs and interests.
- *Pragmatism*: Adults need to apply what they have learned to their real-world lives in practical ways.
- *Internal motivation*: Adults tend to be motivated more by internal factors than by external factors.

From a practical perspective, these adult learner characteristics imply that instruction of adults should be learner-centered rather than instructor-centered. In an adult learning environment the adult student can be relied on to take more initiative and responsibility for his or her own education. The teacher's role becomes more one of facilitation than direction.

This increased independence and personal responsibility permits an environment of collaborative learning, an idea at the heart of the PHOTON2 model. In collaborative learning, knowledge is viewed as a social construct, facilitated by peer interaction, evaluation and cooperation. Fundamentally different from traditional teacher-led instruction, collaborative learning involves the use of instructional methods that encourage learners to work together on academic tasks and acquire knowledge and develop ideas through interactions and responses from others. Research shows that collaborative learning results in more learner involvement with the course and more engagement in the learning process. And it is more effective than traditional methods in promoting adult learning and achievement.

Over the years, researchers have formed some fundamental principles of adult learning, some of which can be applied to the online environment. Morris Keeton, Barry Sheckley and Joan Griggs analyzed a significant number of empirical research studies pertaining to adult learning, resulting in an instructional philosophy that forms the basis of the PHOTON2 web-based professional development model:

Principle 1: Active Learning: Hands-on experience, reflection, practice and feedback to engage learners actively in constructing and organizing a rich, practical knowledge base.

Principle 2: Continuous Learning: A sufficient number of contact hours over time to enhance learner processing and problem-solving.

Principle 3: Coherent Learning: Instruction must allow for practice employing new knowledge in real-world contexts.

By engaging learners through active, continuous and coherent learning within the context of web-based instruction, PHOTON 2 will allow students to develop self-directed skills for lifelong learning, apply both photonics content and new learning strategies to their own courses; and maintain an online community of students, educators and industry professionals that supports continued collaborative learning.

Written by PHOTON2 Co-Principal Investigators Nicholas Massa, Professor of Laser-Electro Optics, Springfield Technical Community College, and Marijke Kehrhahn, Assistant Professor of Adult Learning, University of Connecticut. ■

PHOTON2 Advisory Committee and Visiting Board Meet

Any professional development program is only as good as the ideas that go into its development and direction. With that in mind, Project PHOTON2 has assembled an experienced and dedicated group of scientists, entrepreneurs and educators to participate in our National Advisory Committee (NAC) and our National Visiting Board (NVB).

Each group has a distinct role in PHOTON2's work. The NAC is a panel of experts from the photonics industry and research community who will advise the PHOTON2 team on the project's content. They help ensure that the PHOTON2 curriculum meets industry standards, and that its online course design adheres to principles of adult education. In addition, NAC members offer technical assistance to project participants as needed.

The NVB, on the other hand, works as an external body to monitor the project's work on behalf of the National Science Foundation, which provides the funding for PHOTON2. The Board makes site visits to participating schools and ensures that the project's implementation, evaluation and dissemination goals are achieved. It then reports its findings to the PHOTON2 team and to the NSF.

Last September, the NAC and the NVB convened in Boston for their first annual meeting, and became acquainted with the project and its objectives. The meeting took place over two days and opened with a reception and tour held in the MIT Museum, home to an impressive collection of hologram art as well as exhibits on artificial intellgence and the Space Race of the 1950s and 1960s. Following the reception, the group settled in for dinner and then a presentation by the PHOTON2 team. The presentation reviewed the first Project PHOTON's accomplishments and gave an overview of PHOTON2's goals and methods, with particular attention to the principles of online content delivery and adult learning that PHOTON2 will follow.

The following day, the group reconvened at the NEBHE offices in downtown Boston, where discussion began in earnest about the project. The members were curious about PHOTON2's mentoring structure—how participants would be able to contact experts and discuss with them problems or questions tabout photonics technology or science.

They also talked about the ways in which participants' progress would be evaluated. The discussion of measurement and evaluation overlapped with a review of the adult learning principles on which PHOTON2 is founded. In addition to its main goal of teaching photonics technology to high school and college faculty, PHOTON2 also aims to test certain models of problem-based adult learning. The Board and Committee members paid careful attention to these models, inquiring whether PHOTON2 had a large enough sample of participants to study the models' effectiveness. They also asked whether the goal was merely to teach the teacher-participants in accordance with the adult learning principles, or if PHOTON2 wanted those teacher-participants, when they finished the course, to adopt those same teaching methods with their own classes in their high schools and community colleges.

The members also discussed ways in which industry could be enlisted to help, by hosting internships and externships or by inviting school groups to tour facilities. This conversation also raised the question of what incentives the project could offer industry groups to make their contributions worthwhile. Finally, members talked about the Listserv that had been developed for Project PHOTON as a tool for mentoring new participants. They urged that the Listserv archives be developed into a searchable base of knowledge that could be organized by topic threads.

All in all, the meeting brought some healthy review to Project PHOTON2 and helped the team re-examine what was "ready for prime time" and what aspects of the project needed more work. ■

National Advisory Committee

Robert Breault, Brealt Research Organization, Inc.
Malcolm Chamberlain, Adcole Corporation
Mary DeManbey, CBIA
Robert Douglas, Zygo Corporation
Martin Drexhage, Tantasqua High School
G. Groot Gregory, Lambda Research Corporation
Darrell Hull, CORD
Mark Kahan, Optical Research Associates
Morris Keeton, Columbia, MD
Stephen Pompea, National Optical Astronomy Observatory
Robert Pugliese, Trumpf America
Lowell Putnam, VCI
Michael Ruane, Boston University
Barry Sheckley, University of Connecticut
Peg Stroup, Three Rivers Community College, Conn.
Margaret Sullivan, Optics consultant
Dan Tymann, Cisco Systems
Ken Voisine, JDS Uniphase

National Visiting Board

Jason Briggs, Optical Society of America
Peter Delfyett, University of Central Florida
Grace Eason, University of Maine at Farmington
Wendy L. Gilpin, Pennsylvania State University
Joaquin Ruiz, Sistina Software, Inc.
Ronald E. Scotti, SPIE
Bruce Ward, Harvard-Smithsonian Center for Astrophysics

PHOTON2 Participants, continued from page 1

The New England region includes alliances from Connecticut, Massachusetts and Maine. There are two Connecticut alliances. The Three Rivers Community College alliance includes Plainfield, H. H. Ellis Regional Technical Vocational, and Grasso Southeastern Regional Technical Vocational high schools. Plainfield teacher Don Cameron plans to use technology and hands-on activities to stimulate students learning. He sees a great deal of potential for using laser light in both the physics and chemistry curricula. He also expects that the collaboration with career counselor Donna Belisle will impress upon students the importance of learning about this emerging technology.

Grasso's new electronics technology instructor Anthony DeRosa Jr. plans to increase his knowledge of optics/photonics so he can expand on the fiber optics work initiated by his predecessor. DeRosa plans to include photonics instruction in his advanced electronics program. Career counselor Debra Clarkson will work with DeRosa to recruit new students. H. H. Ellis' science instructor Donna Goyette sees PHOTON2 as an excellent way to strengthen the Tech Prep Physics program. She and career counselor Karen Oriola hope to expose their students to career opportunities they had not known existed.

The second Connecticut alliance includes Manchester Community College and its partner school Great Path Academy. College instructors Peter Poulos and Chuck Russell will develop a new optics course to complement the college's offerings in engineering, technology and computer science. They will be assisted by Bob Fortier, director of the college's Center for Business and Technology, who will work with Great Path Academy's career counselor Karlene Crawford to recruit, advise, and place students into technology programs. Great Path's assistant professor of engineering Catherine Seaver will be joined by faculty member Negussie Tirfessa

The Massachu-setts alliance includes Northeastern University's School of Engineering Technology, Minuteman Regional High School and Tantasqua Regional High School. Northeastern intends to enhance its current associate in engineering and bachelor of engineering technology offerings with photonics concepts. Instructor John Flaherty will collaborate with assistant director of admission Roy Dalsheim to develop articulation agreements and recruit students from the two partner high schools. Warren Atkinson, a physics instructor at Minuteman, plans to use optics education to broaden the current physics curriculum. He also plans to share the PHOTON2 lab kit with the telecommunications/ laser technology shops. Careers coordinator Jan Adams sees greater opportunities for students in Minuteman's physics, robotics and telecommunications programs.

PHOTON2 participants at the NE Alliance intro workshop. First two rows, from left: Connecticut educators Donna Goyette, Ellis RVTS; Negussie Tirfessa, Manchester CC; Anthony de Rosa, Grasso Tech HS; Chuck Russell, Manchester CC.

Coherent/DEOS employees work in the "clean room" during the April 2-3 Introductory Workshop's tour of the site.

Tantasqua already has a well developed photonics technology program in the school's technical division. However, 9th grade physics teacher Dale Ploski would like to sharpen his knowledge and introduce cutting edge optics/photonics examples to enhance the 9th grade physics curriculum. Guidance counselor Chris Hinckley will work with Ploski to inform photonics students about opportunities in the field.

"The PHOTON2 participants will complete the course by designing instructional plans to introduce photonics instruction to their schools."

Maine's United Technologies Center (UTC), which serves high schools in seven neighboring towns, has a new photonics program supported by a U.S. Department of Labor grant. Instructors Ralph Chapman and Fred Woodman will participate in the distance learning course and the other PHOTON2 activities to scale up the UTC program. Their classroom instruction will be supported by the school's director Greg Miller. United Technologies intends to develop alliance relationships with a local community college to build an education/career pathway.

Four other alliances (outside New England) have been accepted. They include the Collin County Community College District (CCCCD) in Frisco, Texas; the Pima County Community College alliance in Tucson, Ariz.; the San Jose City College alliance in San Jose, Calif.; and the Indiana University of Pennsylvania (IUP) alliance. With a high-tech industrial cluster near their college, CCCCD professors Wayne Jones and Tom Mobley and career counselor Julius Turner are upgrading their optic/photonics curriculum and expanding their Tech Prep and 2 + 2 initiatives to meet local workforce needs. CCCCD, which has a 40 percent minority population, will partner with Centennial High School, where Derek McDowell will introduce photonics to

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The PHOTON2 Optics Lab Kit: An Overview

The custom PHOTON2 laboratory kit (developed during the previous Project PHOTON) is designed to support experiments in basic and applied optics in the laboratory manual developed by the PHOTON2 project team.

The PHOTON2 lab kit includes high-quality, industry-standard components and component mounts as opposed to the more common aluminum or plastic educational materials offered by most science education supply houses. Not only is the equipment more versatile than the "educational" variety, it is similar to equipment students will see on industry field trips, making the school laboratory experience more relevant to the world of work. For maximum flexibility, the kit also includes equipment and supplies more common to a school physics laboratory, which enables students to explore basic principles such as refraction and spectra of gases.

Three light sources are provided: a linearly polarized low power Helium Neon laser, a ray box/multi-feature light source, and a gas tube power supply with Hydrogen and Helium gas tubes. Each kit includes an optical breadboard and a variety of mounting posts, post holders and base plates. A lens and mirror kit, plus lens mounts and flat mirrors on kinematic mounts, allow students to perform basic experiments, such as the thin lens equation, and more advanced experiments, such as constructing interferometers and laser beam collimators. A small parts box contains the necessary hardware for assembly, plus small items such as a single and double slit slide and a calcite crystal.

Each kit costs $4,000, half of which is covered by funding from the Advanced Technological Education program of the National Science Foundation. Participating schools must make a $2,000 match through non-federal sources such as local school budgets, area employers or organizations interested in supporting technology education. ■

The PHOTON2 Optics Lab Kit includes...

- 1 24" x 36" Aluminum optical breadboard
- 1 Ray box/Light source
- 1 Laser tilt table
- 1 HeNe laser, polarized
- 1 Spectrum tube power supply
- 1 HeNe Optical Power Meter
- 2 1 inch 50/50 Cube beam splitters
- 2 Linear polarizers, 42 mm dia
- 2 Mounted 1" plane front surface mirror
- 1 Mounted Objective Lens
- 1 Microscope Objective Holder
- 1 Concave spherical mirror

...and much more!

For more information about the kit, contact:
Brian Zatzke, LumenFlow Corp.
email: bzatzke@lumenflow.com
phone: 616-656-5975

PHOTON2 Participants, Continued from page 4

students in the school's chemistry program and newly offered Tech Prep courses.

The Pima Community College alliance includes Desert View High School. Professor Chien-Wei Han has been working closely with the Arizona Optical Industry Association to introduce more optics/photonics curricula at the college. He will be working with Desert View High School's instructor James Trent and counselor Yolanda Fernandez Carr to raise student aspirations. At Desert View, with a 96 percent minority population, currently only 10 percent of the high school's students go on to higher education. Trent is eager to be able to provide more "hands-on" opportunities through the more than 20 lab experiments and the industry-quality lab kit included in PHOTON2.

The West Coast alliance is spearheaded by San Jose City College (SJCC). This college, with more than 12,000 students, has a 72 minority population. Although the college already has a photonics program and a close relationship with California photonics organizations, it wishes to expand into distance learning. Instructor Sydney Sukuta and career counselor Nancy Gressley are eager to collaborate with Lincoln High School. Currently at Lincoln, which has a 65 percent minority population, optics is taught in a limited way in the second semester of the physics course. Instructor Karen Genovese plans to develop a conceptual physics course which will include photonics material from PHOTON2. The administration is also considering offering an engineering technology course in the future. Career counselor Liz Chamberlain will support classroom activities.

The IUP Alliance includes Professor James Sherman of IUP; State College High School instructors Bob White and Wendy McCullough and counselor Scott Deshong; and instructor Paul Longwell and counselor Debbie Lardieri from Hollidaysburg High School. IUP has a photonics program in place and is eager to work closely with the high schools to develop articulation agreements.

All the applicants are eager to try PHOTON2's online course. Each participant will complete the course by designing an instructional plan for introducing photonics into his or her own educational environment.

For further information, contact PHOTON2 Principal Investigator Fenna Hanes at 617-357-9620 x 129 or at fhanes@nebhe.org. ■

High School Students Design New Logos for PHOTON2

Although PHOTON2 is a close cousin of its predecessor Project PHOTON, it is also its own initiative, and so the PHOTON2 team decided to look for a new project logo to reflect PHOTON2's new direction.

In looking for a new logo, the team decided to test the design mettle of students at the Lower Pioneer Valley Career and Technical Center in Chicopee, Mass. Art teacher Patricia Parker, a friend of PHOTON2's Co-Principal Investigator and Springfield Technical Community College (STCC) faculty member Nick Massa, volunteered students in her two commercial advertising art classes to design the logo.

PHOTON2 PIs Nick Massa and Fenna Hanes present logo contest winner Jason Ginman with a check for $100 as Jason's teacher, Lower Pioneer Valley CTC graphic design instructor Patricia Parker, looks on.

Parker provided the students with an overview of Project PHOTON2, explained how the logo might be used and set the students to work. In a matter of two weeks, the students provided the PHOTON2 project directors with 32 options developed by more than a dozen different students. Many of the logos incorporated the light spectrum while others took advantage of the idea of rays of light or a sunburst. Still others came up with unique and interesting ways to arrange the word PHOTON2.

To give the students a little extra motivation, PHOTON2 offered the winner a cash prize. In addition, all the students who participated were treated to a breakfast at the school's student-run cafeteria. Even though it was difficult to chose the winner, there was a clear consensus among the PIs on a design by senior Jason Ginman, which you can see here and on the newsletter's front page.

Jason, it turns out, is no newcomer to graphic design. He won another logo competition this year for the "Great Chefs" local fundraiser for the Jimmy Fund. When asked how he came up with his PHOTON2 design, Jason explained that he knew a little bit about lasers and light and decided to take advantage of the colors in the spectrum.

Jason wants to continue his studies in art and plans to attend the graphic design program at STCC, the same program from which his teacher, Ms. Parker, graduated a number of years ago. Ms. Parker explained that both STCC and Holyoke Community College, which is also nearby, are excellent options for students as a first step into post-secondary education in design. Upon receiving her associate degree from STCC, she started her own design business and eventually continued on to Westfield State College to obtain her bachelor's degree and enter the teaching profession.

Lower Pioneer Valley Career and Technical Center serves seven towns in the Springfield area that do not have vocational technical programs. Most students spend half of the day in academic programs in their home institution and are bussed to the Center for the other half of the day to participate in vocational/technical courses. Before Ms. Parker arrived, the only program available for students interested in graphic arts was a course in desktop publishing. Now, students have the option of the commercial advertising art program as well. The school is small and allows for small classes and personal attention to students. The school will move to new quarters in West Springfield next year, providing the students and teachers with expanded facilities and new educational opportunities. ■

Jason Ginman's winning logo design.

Career Spotlight

Ken Voisine: At the Crossroads of Business and Engineering

This spring, PHOTON2 spoke with Ken Voisine, Engineering Manager at JDS Uniphase in Bloomfield, Conn., about his educational and career path.

Voisine studied with Co-Principal Investigator Professor Nick Massa at Springfield Technical Community College (STCC) and is now a member of PHOTON2's National Advisory Committee. His career illustrates the many possibilities opened by a background in photonics science and technology.

Voisine started early in engineering. Born into what he calls a "hands-on family," Ken would spend time in his engineer uncle's workshop learning to tinker with lawn mowers, cars, anything that had circuits and switches. It was hardly a surprise, then, when he decided to attend a vocational school and focus on electronics.

When he enrolled in an associate program in Electronic Engineering Technology (EET) at STCC, he found that the vocational school education "gave me a significant leg up on the other students." It was there, across the hall from the Laser-Electro Optics program at STCC, that he became fascinated with photonics. He found the new field so exciting that when he finished his EET program he turned around and went right back for a second degree in optics.

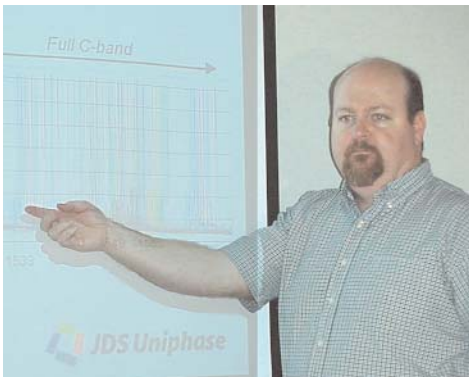
> "Although community college and night school was a more difficult path, the benefit was that I was in the field while I was learning about the field."

Voisine later went on to complete his bachelor's at the University of Hartford, which had recruited him to enter its program in photonics technology. He studied nights at Hartford while working for United Technologies during the day, a difficult but ultimately rewarding route.

"People ask why I didn't just go for a bachelor's right off," he says. "Although community college and night school was a more difficult path, the benefit was that I was in the field while I was learning about the field."

Voisine started at United Technologies as a research engineer, but after five years in that position, his career took a new and satisfying turn: he was transferred from research to operations. Suddenly instead of focusing on the details of a few prototypes, Voisine was overseeing the entire development of a product from initial request to final roll-out. In the process, he learned a tremendous amount about business.

Since then, his taste for operations has guided him into engineering management. He now oversees several teams of engineers working in areas like product development, process control and on the production floor—giving him a "soup-to-nuts overview of the engineering process." For someone who has spent his whole life playing with any technology he could get his hands on, it's the perfect job.



Ken Voisine of JDS Uniphase.

"On an average day," he says, "I take input from the marketing department about what the customer wants, and then I look at the products we're developing to see how well they meet the customer's needs. I make sure all the different departments are in synch for product introduction into the marketplace." Departments are usually working on a few products at once, so development processes need to be carefully managed to make sure the work is done on time. Voisine describes himself as a "maitre d'," or as a conductor of an orchestra—"I may not play an instrument, but I make sure everyone stays in tune."

In such a role, Voisine's lifelong pursuit of engineering once again gives him a leg up. "Knowledge of engineering lets you ask the right questions and guide development more effectively," he says. "You're better positioned to help people think about problems in a different light."

For young people interested in photonics careers, Voisine recommends the tried and true. "Have a solid understanding of basic math and physics," he urges. "Technology changes all the time, but not the basics. If you know those fundamentals you'll be equipped for whatever changes come along." The photonics industry is growing rapidly, he believes. Areas such as medicine and aerospace have shown sustained growth, and even telecom has reawakened recently. In all of this, Voisine sees an opportunity for young would-be engineers who pursue associate or bachelor's degrees in optics. With the right skills, he says, students could look forward to a wide variety of careers. ■

PHOTON2 applications for Cohort 2
due MAY 28, 2004
Applications can be downloaded from
www.nebhe.org/photon2.html

PIs Disseminate at Meetings, continued from page 1

Judy Donnelly, PHOTON's Principal Investigator and Co-Principal Investigator for PHOTON2, delivered two papers. The first, "Collaboration in Photonics Training," was co-authored with Caren R. Dickman of the Connecticut Business and Industry Association.

PHOTON2 PI Fenna Hanes with National Visiting Board member Ronald Scotti of SPIE at the Photonics East Symposium in October.

Donnelly also presented "Growing a Photonics Program in Good Times and Bad.'" Written in collaboration with Three Rivers Community College (TRCC) instructor Randall Seebeck, the paper presented a "history" of TRCC's associate program in Photonics Engineering Technology.

Photonics East Symposium

More than 1200 people attended the Photonics East symposium from October 27-30, 2003, in Providence, RI. Sponsored by SPIE, the exhibit featured 90 companies and attracted attendees from New England and around the country.

PHOTON2 Principal and Co-Principal Investigators Fenna Hanes and Judy Donnelly were among the exhibitors at the conference. Among those who attended the conference were PHOTON2's National Visiting Board members Wendy Gilpin from the Penn State Electro Optics Center; Ron Scotti, SPIE science and technology strategist; as well as National Advisory Committee member Malcolm Chamberlain with the Adcole Corporation.

Hartford, Conn. Meeting of the American Society of Mechanical Engineers (ASME)

On Nov. 12, 2003, PHOTON2 Co-Principal Investigator Barbara Washburn participated on a distinguished panel of photonics experts at the Hartford, Conn. chapter meeting of ASME. Panelists included Mark Bliek, president of Bolton Works; Stuart Farquharson, president of Real-Time Analyzers; Groot Gregory of Lamba Research Corp.; and James Sirkis, director of advanced technology at CIDRA Corp. The panelists responded to a presentation by University of Connecticut Professor Chandra Roychoudhuri, and shared their views on where photonics technology is headed and what effect it will have on the regional economy over the next 10 years. ■

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