The Intel Innovator

Elementary and Secondary Education

Shaping the National Agenda

Educational Technology Leaders Come Together at NECC

How can schools in the United States do a better job of engaging the students who are growing up as "natives to technology"? That's a critical question that must be addressed in the National Education Technology Plan now under development, according to John Bailey, director of educational technology for the U.S. Department of Education.

Bailey participated in a day of high-level brainstorming in late June with educators, researchers, and policymakers invited to the 10th annual Leadership Symposium held by the International Society for Technology in Education and sponsored by Intel® Innovation in Education. The symposium took place in Seattle, Washington, on the eve of the National Educational Computing Conference (NECC), the largest annual gathering focusing on educational technology.

As a special event during NECC, Intel Teach to the Future celebrated its million-teachers-trained milestone with a toast.

The Leadership Symposium brought together both U.S. and international leaders to examine the current status of technology integration and make suggestions to shape future policy. "The good news," Bailey told the summit, "is that we are finally moving toward integration. People are not seeing technology; they are seeing what technology allows us to do."

> **"People are not seeing technology; they are seeing what technology allows us to do."**

Students weighed in with ideas of their own for using technology as a tool to serve the needs of all learners. Developing better ways to test what students know, using distance learning to create more flexible school schedules, adapting cell phones as a tool for learning, and using technology to build stronger connections between students and teachers were among the ideas shared by youth during a special luncheon presentation.

Connecting With Teachers

NECC attracted nearly 10,000 educators and other experts to exchange classroom ideas and get an early look at emerging technologies. At the Intel Innovation in Education booth, for example, educators by the hundreds stopped by to download conference information onto their handheld computers, hear about free professional development, and find out about the newest online tools and resources available on the intel.com/education Web site. Workshops gave teachers and instructional leaders a more in-depth look at resources such as *Seeing Reason*, a causal mapping tool, or *Design and Discovery*, a pre-engineering curriculum. Teachers and school leaders also showed strong interest in the Intel® Teach to the Future training program and a new online course, *TIMSS Video Studies: Explorations of Algebra Teaching*.

One of the hot topics of the conference was weblogs, a form of Web publishing that is quickly gaining a foothold in education. Educational webloggers tracked conference events on their own blog during NECC (necc.edweblogs.org). An evening event, hosted by Intel Innovation in Education, brought together weblogging pioneers and those curious about the potential of weblogs to engage students. In coming months, Intel Innovation in Education plans to offer new resources to help more educators integrate this interactive publishing forum in the classroom.

As a special event during NECC, Intel Teach to the Future celebrated its million-teachers-trained milestone

with a "thank you" reception. Intel Teach to the Future participants and master teachers exchanged hugs and handshakes, with more than twice the expected number gathered. Intel CEO Craig Barrett delivered a video message of congratulations, and Wendy Hawkins, director of the Intel Innovation in Education Initiative, led the crowd in a toast. Since Intel Teach to the Future was launched three years ago, it has spread to every continent and now reaches teachers in 30 countries.

If you were not able to attend NECC, please visit additional resources on this Web site to find out more about our latest tools and resources for teachers.

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Science Project May Be a Lifesaver

Intel ISEF Finalist Shares Research Insights

Family members erupted in cheers at the awards ceremony for the Intel International Science and Engineering Fair (Intel ISEF) 2003 in Cleveland, Ohio, when Sam Howell, age 16, from Saginaw, Michigan, heard his name called as the first-place individual and also best-of category winner in the biochemistry division. His older sister, Heather Boyes, was especially emotional. Her brother's science research project may help save her life.

In 2002, a few months after giving birth to her third child, Heather Boyes was diagnosed with a rare and potentially fatal form of cancer. Because lymphomatoid papulosis affects such a small population, the disease receives little attention from researchers. There is no known cause or cure.

Boyes recalls her brother's response when she told him about the diagnosis. "He said, 'I'm going to save you.'" She was moved but didn't fully appreciate his comment. "I didn't realize Sam had such a deep understanding of the scientific process," she says.

In his advanced placement biology class at Saginaw Arts and Sciences Academy, a small public high school for gifted students, Howell had studied genetics. "I knew that genetic fingerprinting is a good way to identify the origin of cells," he explains.

Yumi Kajiwara, Intel's Education Manager in Japan, congratulates Sam Howell on his research discoveries at the

Further research led him to hypothesize that the T-lymphocytes involved in this disease do not originate in the subject's body, but instead are of "extraneous origin." He suspected that fetal stem cells are transferred from fetus to mother during birth. He planned to use DNA fingerprinting as a test of his theory.

> **"At age 16, Sam Howell is doing research that may help save his sister's life."**

Howell estimates he spent 700 hours doing laboratory work, both at his high school and at the research lab at Saginaw Valley State University. The university provided access to the equipment and procedures he needed to analyze DNA samples, using polymerase chain reaction and electrophoresis. "These are standard procedures that I had to tweak a little," he says.

There were challenges along the way as he pushed deeper into an area that few researchers have studied. But step-by-step he obtained results that supported his hypothesis. When he reached a particular breakthrough that showed a DNA match, "I was ecstatic," he says. He was also surprised. He had expected to find a match between his sister and her third child. Instead, the evidence showed a match with her first child.

For the most part, Howell worked solo. "I didn't have much of a life outside of this project and school," he says. Some nights he stayed in the lab until the janitors came to lock up. His motivation never wavered. "My sister has given me so much. The least I can do is to help her live her life to the fullest."

As he looks back on the experience, he's a little surprised at how far he's come. "I never would have thought I'd be able to tackle something like this. I can see now that it was a lot of work. But you do it step-by-step, one objective at a time. And you learn as you go," Howell says.

At the awards ceremony in Cleveland, a longtime judge for Intel ISEF happened to be sitting behind the Howell family cheering section. John Birchak is manager of Applied Research and Development and Innovation in the Knowledge Solutions Group of Intel. When he heard about this 16-year-old's achievement, he was reminded how Intel ISEF brings out the best in young scientists and engineers from all over the world. "As always, I'm humbled and energized by the students. Intel ISEF continues to bolster my faith in the goodness of humanity," Birchak says.

Howell might have done his research without an international competition, Birchak adds, "but Intel ISEF gave Sam a framework from which he could not only solicit help from teachers and research resources, but he could also widely share the findings of his research with many professionals—which is not easy to do when one is just 16. Although Sam's greatest prize is his sister's life, the Intel ISEF prizes awarded to Sam will hopefully become a springboard from which he can save many lives. Year after year as a judge, I'm convinced: Intel ISEF makes the world a better place."

Howell plans to continue with his research. He hopes that finding the cause for his sister's disease may help lead to a cure. His advice for other students thinking about tackling a science project: "You need direct motivation. It has to be something you care about, something related to your life. It's OK if you don't know that much going into the project. You will by the end," he promises.
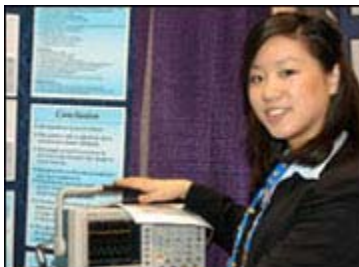
Information about Intel ISEF is available at Intel International Science and Engineering Fair on the Web.

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Student Researchers Share Stories of Persistence

Student researchers who compete in the Intel International Science and Engineering Fair (Intel ISEF) are an elite bunch. Each year, more than a million students around the world compete in Intel ISEF-affiliate fairs at the regional, state, and national level, hoping for a spot among the 1,300 finalists at the international event.

What does it take to get your research project all the way to the finals? At Intel ISEF 2003 in Cleveland, Ohio, students talked about the importance of persisting through challenges, getting help from knowledgeable mentors, and leaning on families for moral support. "Everybody gets stuck now and again," said a student from South Africa who did environmental science research. "You just have to keep going."

After a year of studying scientific properties of a traditional medicine in the Philippines, Eigen Israel Rara, is convinced he has discovered a wonder drug.

Michelle Louie shows the sensing system she designed to help locate survivors after a disaster.

Having a passion for your subject is a key to staying motivated, added a student from New York who completed an engineering project. When she felt stuck, she didn't hesitate to pick up the phone and ask questions of experts. "These were simple questions for them, but I needed to be sure I was using the right methods. They were more than willing to help," she said.

To read more about what inspires and motivates student researchers at Intel ISEF, visit the Intel International Science and Engineering Fair Web resources.

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Broadening Horizons

Facilitator Workshops Bring TIMSS Research to Math Teachers

A new facilitator workshop, designed for those involved in staff development and pre-service education, examines findings from the Third International Mathematics and Science Video Study (TIMSS) and prepares facilitators to engage their colleagues or students in an examination of effective mathematics instruction.

Teacher participating in TIMSS online video series.

The facilitator workshop is based on *TIMSS Video Studies: Explorations of Algebra Teaching*, an online professional development course that includes video footage of classroom instruction in several countries where students have excelled in mathematics, and addresses highlights of the TIMSS Video Studies findings. To prepare to facilitate the TIMSS Video Studies course, applicants are required to complete this online course as a prerequisite to beginning training.

During the facilitator workshop, conducted in two eight-hour days spent face-to-face with a senior facilitator, participants become more familiar with the *TIMSS Video Studies: Explorations of Algebra Teaching* course and the variety of ways it can be incorporated into professional development for teachers. In addition, participants receive facilitation guidelines, and tips to help present the material and engage mathematics teachers in activities that focus on improving instruction.

Rita Bixler, a K-12 mathematics consultant for South Carolina's Greenville County School District, participated in the pilot facilitator workshop in May, and intends to incorporate the *TIMSS Video Studies: Explorations of Algebra Teaching* course in staff development beginning this fall. "For me, what was most fascinating was the TIMSS study itself—the fact that so many high-achieving countries used such a variety of strategies," she explains.

One of the key findings of the TIMSS study was that no single method of teaching mathematics is required for students to achieve. Further, it became clear that much could be learned by examining a variety of teaching methods and by searching for ways to engage students in serious mathematical work.

Bixler says that, during the facilitator course, she and her colleagues attempted to look beyond the surface for commonalities in the teaching strategies of high-achieving countries. What they ultimately decided was that, despite the variety of approaches, successful teachers were unified in teaching for understanding. "There was more justification of how students found answers. Students had more time to construct their own meaning," she observes. Instead of simply teaching procedures, effective instructors provided their students with tools for problem-solving. In short, she says, "They taught to the heart of mathematics."

Teachers working with Bixler have heard so much about the TIMSS study that "it will be nice for them to see the findings and reflect on their own practice—and to see how what they do in their classrooms compares to [what's being done in] other countries." She adds, "I certainly think it will broaden their viewpoints."

Facilitators can take the *TIMSS Video Studies: Explorations of Algebra Teaching* course to teachers through a combination of online and face-to-face instruction. Bixler says, "The way it is delivered offers flexibility. The advantage is that teachers can make it fit their schedules."

The facilitator workshops are underwritten by the Intel Foundation and include two full days of facilitated instruction, a facilitator guide, and an online toolkit to assist in implementing this valuable professional development course. Participants need only to cover such expenses as travel and lodging.

For more information on facilitator workshops and the online course, visit TIMSS Video Studies: Explorations of Algebra Teaching on the Web.

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Looking for Leaders

Innovative Leadership Highlights Educators on the Cutting Edge

In the world of education, the innovators stand out. Whether they're making good things happen one classroom at a time or leading the way across a wider region, these are the leaders willing to take risks and embrace new ideas. By sharing their enthusiasm, results, and resources with colleagues, they also help good ideas travel.

To recognize those who are leading by example, Intel® Innovation in Education is preparing to launch a new Web-based resource called Innovative Leadership. This resource will feature detailed case studies about educational leaders from around the world and the valuable resources they are developing.

What does innovative leadership look like in practice? Upcoming case studies will introduce leaders who are integrating cutting-edge tools and emerging technologies to support student learners.

The first set of case studies will highlight exceptional educators working in a variety of geographic settings around the world. Look for upcoming case studies about:

- An educator in a high-poverty, urban high school in the midst of school reform, who is using open source software to develop online assessment tools that support performance-based assessment.

> **"In the world of education, the innovators stand out."**

- Teachers at a boarding school for Native American students, who have developed a successful model of community-based education that's supported by technology.
- A network of teachers who are pioneering the use of weblogs in education, inspiring diverse students to communicate their ideas and to develop higher-level thinking skills.

Know an Exceptional Leader?

Who are the risk takers and innovators in your educational community? Intel Innovation in Education is interested in hearing about educators who are making a difference, especially through the use of emerging technologies and creative problem solving.

Suggestions will be evaluated on the basis of both innovation and leadership. Educators to be profiled in future case studies will be contacted for more information.

To learn more about Innovative Leadership, visit www.intel.com/education/leaders.

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Helping Educators Use Emerging Technologies

New Online Resource Explains How Tools Serve Classroom Needs

Emerging technologies tend to be high on the "wow factor," loaded with bells and whistles that initially capture student interest, but lose their fizz with ill-defined educational benefits. Typically, the newest technologies emerge to serve worlds of work and business and then move into educational settings with thoughtful adaptation by innovative educators. The effective practices of these early adopters are picked up and spread "at the speed of education." The glacial pace results in not-so-new technologies becoming the standard in classrooms.

Intel® Innovation in Education seeks to advance the infusion of innovative uses of emerging technologies in education by providing online resources and professional development for educators.

Handhelds allow students to collect data in the field.

The newest resource is Learning With Handhelds. The Web resource provides a wide range of information and lesson ideas for incorporating handheld computers in teaching and learning.

Handheld computers hold great potential for use in education. They allow students to have a highly mobile and extremely powerful computer in hand, whether in the classroom, in the lab, or in the field. *Learning With Handhelds* includes three sections: About Handhelds, Managing With Handhelds, and Teaching With Handhelds.

> **"Typically, the newest technologies emerge to serve worlds of work and business and then move into educational settings with thoughtful adaptation by innovative educators."**

The *Learning With Handhelds* Web resource offers information and lesson ideas appropriate for educators all along the spectrum, from those who are new to handhelds to more advanced users. It includes answers to common questions about hardware and software and for those looking for more in-depth information, the site also highlights what researchers have discovered about the benefits of using handheld computers in education. Instructional examples come from real-world classrooms.

Although handhelds are still more commonly used by administrators than by students, their capabilities get full expression in the classroom. The devices assist students in being more connected and more collaborative with their work and research. With capabilities such as wireless connectivity or the addition of probes for recording temperature, pressure, and pH, a handheld enables students to move beyond their desks into the world of research, data collection, and engaged learning.

Handhelds also offer students and teachers a powerful management tool to use as personal assistants to manage schedules and stay connected with their classroom work, activities, assignments, and grades.

Emerging Technologies Workshop

To help educators stay informed about what's ahead, a new workshop has been added to the Intel® Innovation in Education Institutes. The *Emerging Technologies in Education* workshop is the latest addition to this suite of free professional development opportunities. With a focus on identifying and adapting new technologies for the classroom, participants will learn about and try out weblogs, handheld computers, syndication, and more.

Educators participating in an Intel® Innovation in Education Institute

The *Emerging Technologies in Education* workshop introduces educators to the process of implementing new technologies in four steps:

1. Identify: What do new technologies allow the user to do?
2. Isolate: What are the most important and most interesting features?
3. Analyze: Where do these features or tasks show up in education?
4. Apply: Could this technology be applied to enhance learning?

For more information about hosting an Intel Innovation in Education Institute in your community, visit the Intel Innovation in Education Institutes Web page.

Elementary and Secondary Education

Changing Classroom Experiences

At a Million and Counting, Intel® Teach to the Future Continues Global Expansion

When Intel® Teach to the Future reached its million-teachers-trained milestone earlier this year, it was cause for worldwide celebration—but not a signal to slow down. The three-year-old training program has continued to expand into new regions, delivering hands-on professional development that enables educators to improve learning experiences for their students.

The continuing program in Argentina and new programs in South Africa and Turkey deliver the style of training that has made Intel Teach to the Future popular with educators in 30 countries. Since the start of the program in 2000, it has succeeded by relying on master teachers to lead their colleagues. The curriculum is similar worldwide, but is adapted in each region to meet local needs.

Dr. Huseyin Celik, Turkish Minister of Education, speaking about the partnership between Intel and the Turkish Ministry of National Education to bring the Intel Teach to the Future program to Turkey.

Argentina
Many teachers say they are changed by the experience. Maria Cecilia Cuello, who teaches English in Puerto Madryn, Argentina, describes the results of her recent training, "In two words: confidence and insight. After the training, I was much better at handling the different tools and programs most computers have."

What's more, she now appreciates the benefits that come to students when the teacher is able to incorporate technology effectively. "Students have to become more involved with technology, even in a field like English as a second language, if they want to take an active part in this 21st century world," she says.

Like many Intel Teach to the Future participants, Cuello enjoyed the opportunity to focus on her own learning and work alongside colleagues. "I could be in my students' shoes for a while," she says, "dealing with some of the problems and successes they might face in a real school computer project." She adds, "The whole program is so well staged that you hardly realize you are being taken gently from step to step, until you see your final productions."

The experience has changed Cuello as a teacher. "The program has certainly modified my teaching style. It has opened up new options for language practice." With her older students and adult learners, she adds, "it has helped me introduce students to a more professional way of studying." Her homework assignments are now apt to engage students in developing electronic presentations or creating professional-looking documents that supplement oral presentations.

South Africa
Meanwhile, in South Africa, the first Master Teacher training session was accompanied by a celebration and a welcome from the national minister of education. This marks the first professional development program in South Africa to be adopted by the South African Council for Educators, which represents teachers' unions and government officials. The goal for 2003 is for Intel Teach to the Future to train 4,000 educators in South Africa.

Turkey
In Turkey, the recent launch of the program came about through a partnership between Intel Turkey and the Turkish Ministry of National Education. The ambitious goal is to train 50,000 Turkish teachers within three years. Localization and adaptation of the Intel Teach to the Future curriculum is being performed by the education faculty of Bogazici University in Istanbul.

According to Dr. Huseyin Celik, Turkish Minister of Education, "You can fill all classrooms with computers, but if you don't train the teachers on how to use them effectively, the investment you made will lose all importance."

Intel Turkey Country Manager Aysegul Ildeniz says the professional development program will promote equal opportunities in education. "The best equalizer we can use is to present information technologies to our school children. Teachers who understand the best way to use information technology in education will be the ones that present these technologies to kids," he explains.

Elementary and Secondary Education

Bringing Resources to You

Syndication Brings Content to School Web Sites

Does your school or district have a Web site for providing teachers with education resources? Intel® Innovation in Education offers an easy, free way to regularly update the content on your site through Web syndication.

Web content syndication is similar to newspaper syndication. It delivers a regularly updated feature from the originating Web site to any other site interested in receiving that same content. With the one-time addition of a few lines of code, changes are automatically updated. This process is known as a "feed."

Currently, *An Innovation Odyssey* is available for syndication at no cost. *An Innovation Odyssey* shares stories about teachers from around the world who use technology to support effective instruction. Teachers can browse the collection of more than 300 stories to gain ideas for use in their own classrooms. A searchable index allows teachers to sort projects according to grade level or subject area. Because new stories are added regularly, syndicating Odyssey means that the user's Web site gets updated frequently and automatically.

Portland (Oregon) Public Schools syndicates *An Innovation Odyssey* on the district's instructional technology resource Web site. "Syndication of the Odyssey content has provided me an easy means of sharing innovative uses of technology with my district's teachers," said Melissa Lim, technology specialist for the district.

Similarly, a middle school has syndicated *An Innovation Odyssey* to its Web site, as one of several links on a resource page for teachers and students. "The feed took less than 15 minutes to set up and has been a terrific addition to our site," according to the school's vice principal. After just a few minutes required for setup, syndication automatically delivers fresh content with no more involvement required by the school's Webmaster. Two different coding methods are available for syndicating Web content feeds. Both methods allow users to control the location of the feed on their site. However, they differ in the amount of control allowed for formatting the look of the resource. A school's or district's Webmaster is responsible for determining the format of the content feed. By choosing the XML feed, the Webmaster has more control over the look of the content. By choosing the HTML option, the Webmaster can select from two preset options (vertical or horizontal).

For more information about syndication or to see how other schools are syndicating content from Intel Innovation in Education, visit syndication.

Elementary and Secondary Education

New Tool Coming Soon

Watch for Visual Ranking

A new interactive tool called *Visual Ranking* will be available soon on the Intel® Innovation in Education Web site, bringing K-12 teachers a free resource designed to engage students in higher-order thinking.

Visual Ranking builds on the activities of making lists and ranking entries in order of importance or other criteria. When students create lists of their favorite songs or rank the colleges they plan to apply to, for instance, they are using a number of higher-order skills, including analysis, evaluation, and decision making. In the classroom, the *Visual Ranking* tool can be used for setting priorities, reaching consensus, debating differences, making correlations, and organizing ideas.

> **"The *Visual Ranking* tool can be used for setting priorities, reaching consensus, debating differences, making correlations, and organizing ideas."**

By bringing *Visual Ranking* to the Web, the tool will be available from any computer with Internet access. Like *Seeing Reason*, another tool already available on the intel.com/education Web site, *Visual Ranking* will include a free teacher workspace for saving projects as well as classroom strategies, examples, and other resources.

For more information about *Visual Ranking*, watch the Intel Innovation in Education Web site. To stay up-to-date about other new tools and resources, subscribe to The Intel® Innovator.

Higher Education

Growing Engineers

Student Research Contest Awards Student Innovation

The caliber of student research projects at last year's Intel Student Research Contest (ISRC) was so impressive that it inspired this year's winner. Notre Dame University junior Dane Wheeler came to Santa Clara, California, to participate in the ISRC, and left determined to come up with a project to snare a place in the competition during his senior year.

To make the cut the first year, the electrical engineering student's project had involved fabricating silicon tunnel diodes via rapid thermal diffusion. But to return the following year and maybe even have a chance at winning, Wheeler says, "I knew I would have to come up with a really good idea."

> **"The goal of this competition is to stimulate inventiveness by challenging undergraduates in science and engineering disciplines to explore frontiers in computing."**

The ISRC attracts some of today's best and brightest students in Intel's drive to support the use of cutting-edge technology in higher education, to promote research in emerging technology areas, and to develop future engineers and computer scientists to support tomorrow's technology needs. The goal of this competition is to stimulate inventiveness by challenging undergraduates in science and engineering disciplines to explore frontiers in computing. The effort supports existing undergraduate research at universities and complements senior honors projects.

To take part in this year's competition, university undergrads were invited to submit proposals for promising research projects. A committee then selected 17 finalists from 12 universities. Each finalist was awarded up to US$2,000, based on the research budget submitted with the proposal, and given nine months to conduct research under the supervision of a faculty advisor and an Intel technical advisor.

In April 2003, the finalists came to Santa Clara to share their projects and research results. Presentations were varied and included demonstrations of such innovations as a system potentially capable of tracking a firefighter inside a rapidly changing structural fire; a computer-assisted simulation tool that could assist surgeons in craniofacial surgery; and assessing the "health" of a community, based on pollution, crime, and cancer statistics.

The project taking top honors at this year's competition explores the replacement of electron-based logic circuits with those powered by light. The brain behind the project? Dane Wheeler, now a senior at Notre Dame.

"The goal," Wheeler explains, "was to create transparent, all-optical communications technology that enables switchers and routers to operate at the speed of incoming optical information, thereby eliminating current bottlenecks created by electronic switches." In short, this translates to creating technology that would allow for faster communications.

Further, Wheeler proposed that these faster communications could be realized using less space than current technology. With silicon-on-insulator (SOI) technology, he suggested, all-optical logic devices could be created on tiny SOI wafers via a common fabrication technique.

To test his thesis, Wheeler created a three-input XOR tree, a device for checking the parity of a communications signal. Although time constraints prevented Wheeler from connecting his creation to a laser to take conclusive measurements, he was able to perform computer simulations indicating that the device should work as intended.

While Wheeler initially hoped this work would lead to the development of "a light computer that was faster than electricity," he notes that the most practical current use for this technology is in communications.

Wheeler plans to continue working on the project through the summer and may even continue this line of research in graduate school. As for long-term goals, he says, "Eventually, I'd like to find an industry research position."

The ISRC is an annual event open to undergraduate students in science and engineering. More information about the competition can be found at Intel Student Research Contest 2003-04.

Higher Education

Academic Forums

Exchanging Ideas About Technology Advances

"An Intel Academic Forum is a unique event that brings together key faculty from leading universities and technology leaders from Intel to exchange ideas about technology advances. Results include stimulating conversations, new learning, and the opportunity to forge professional relationships with colleagues," said Tim Saponas, Intel worldwide manager of higher education.

The Eighth Intel European Academic Forum was held in Berlin, Germany in April 2003 with over 50 professors representing 34 universities in Europe, the Middle East, and Africa meeting with each other and Intel technologists. The three-day event included an open forum with Intel fellows, panel discussions, and academic presentations on specific research areas. During the event, participants exchanged ideas, results, and opinions about frontiers in wireless technology, multimedia algorithms, high-performance computing, and nanotechnology. Some of the presentations were:

> **"Results include stimulating conversations, new learning, and the opportunity to forge professional relationships with colleagues."**
>
> —Tim Saponas, Intel Worldwide Manager of Higher Education

- A Novel Approach to Interoperability of Distributed Devices
- Quantum Dots and the Next Revolution in Optoelectronics
- Videocoding for Wireless Streaming Applications
- Nanoscale Processing of Silicon and Metal Interconnects
- Enabling Solutions for Untethered Applications; Low-Power Design

The First Intel Asia Academic Forum is planned for October 2003 in Shenzen, China. Topics include mobile computing, microprocessor design, and high-performance computing, among others. The Forum will provide an opportunity for sharing among Intel technology specialists and over 40 professors from China, India, Malaysia, the Philippines, and Taiwan.

Community Education

Creative Communication

Valuable Experiences for Mentors and Members at Ayala-Intel Computer Clubhouse in the Philippines

When Aila Tibayan and Nina Mariano volunteered to be mentors at the Ayala-Intel Computer Clubhouse in Makati City, Philippines, one thing made them special: both are profoundly deaf. The two young women will receive their bachelor's degrees this summer from De La Salle University College in Applied Deaf Studies with a specialty in multimedia arts. They are completing two-month internships at the Clubhouse to gain on-the-job experience working with hearing people.

Makati City is a densely populated international business hub that is part of metropolitan Manila. On the second floor of a parish building belonging to the Mater Dolorosa Church, the Ayala-Intel Computer Clubhouse hums with activities from Tuesday through Saturday. For its 250 registered members, ages 10-17, the Clubhouse is a popular after-school stop in this relatively poor community of 42,000, where so few have computers at home that members must schedule their time on the Clubhouse workstations.

> **"When Aila Tibayan and Nina Mariano volunteered to be mentors at the Ayala-Intel Computer Clubhouse in Makati City, Philippines, one thing made them special: both are profoundly deaf."**

"At first, we were concerned about how we would communicate with Aila and Nina," says Maui Salang, coordinator of the Clubhouse, who arranged for their internship. "In the beginning, they used written notes and hand gestures, and the students were very creative in using body language to express what they needed to say. But before long, Aila and Nina were teaching Clubhouse members the manual alphabet and basic sign language. From then on, it was easier to communicate."

Like most people of the Philippines, Tibayan and Mariano are bilingual, communicating in Tagalog, the national tongue, and in English, the official and dominant language. As deaf students, they were taught "total communication," a method that encourages the use of all expressive avenues in social interaction. Depending on the situation, the young women might use sign language, sounds, lip reading, and written notes.

Mariano, 23, was born deaf. She can hear loud sounds but not words, and she says that Clubhouse members often get her attention by clapping their hands or shouting. "SSSSHHHHHH is a sound I can hear," she says, "and so that has become my nickname with the students." After graduation, Mariano hopes to teach multimedia arts in middle school.

Tibayan, also 23, became deaf as an infant. She learned sign language at the Philippine School for the Deaf, and she communicates in both English and Tagalog. Having completed her studies, she hopes to get a job designing graphics for a commercial studio.

Recently the two mentors, along with Salang and an interpreter, taught Clubhouse members a three-day workshop in Macromedia Director*, a software program that integrates interactive audio and video, and is excellent for creating accessible content for people with disabilities, such as captions for the hearing impaired and self-voicing for the blind.

"Aila and Nina have generously shared their talents in the multimedia arts with us," says Salang, "and they are very patient in helping our members with their projects. We are so happy to have them here at the Clubhouse!"

To learn more about Intel Computer Clubhouse Network locations around the world, visit the Intel Computer Clubhouse Web page.

Engineering Success

Design and Discovery Participants Earn Recognition for Projects

Erika demonstrates how the Bass Space helps string bass plays keep their fingers in the proper playing position.

Six middle school students from Oregon who learned to apply engineering principles and design processes to solve real-world challenges received awards for their projects at a regional science fair earlier this year. All have been participants in *Design and Discovery*, a pre-engineering curriculum available, free of charge, on the Intel® Innovation in Education Web site.

The students' creative projects demonstrate the wide range of ideas taking shape as a result of *Design and Discovery*. The curriculum is intended to engage student interest in engineering through an extended sequence of hands-on sessions. It is suitable for informal education as well as for more traditional classroom settings.

The award-winning students—all girls—participated in *Design and Discovery* as part of a summer enrichment camp. Awards were presented during the Northwest Science Expo, a regional fair affiliated with the Intel International Science and Engineering Fair.

Their projects are working prototypes that solve real-life problems, such as:

Brenda shows the internal workings of her designed alarm clock.

- Two Alarm Clocks in One: a clock radio with dual independent speakers to solve the problem of different wake-up times for two sisters sharing a bedroom. The young inventor earned an honorable mention in engineering.
- FresH$_2$0: an automated water dispenser for small pets, such as guinea pigs. The pair of student designers, who won third place in engineering, wanted to solve the challenge of providing fresh water for pets while the owner is on vacation.
- Bass Space: a training device that helps string bass players keep their fingers in the proper playing position. The girls who developed the project earned first place in engineering and a nomination to compete in the Discovery Young Scientists Challenge.
- Soccer Referee Scheduling Application: winner of second place in computer science, this software design solves the challenge of coordinating complex schedules for soccer referees.

Go to the [Design and Discovery](#) Web page to learn more about the project.