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New Version of The Journey InsideSM Goes Live Popular Technology Curriculum Gets an Update

Recent technological advances have led to the growth of wireless connectivity, faster processors, and the concept of the digital home filled with interconnected devices for entertainment and communication. *The Journey InsideSM*, an online multimedia curriculum that explains how computers and the Internet work, has been updated and expanded to address these innovations with engaging new lessons and activities.

Introduced online in 2000, *The Journey Inside* has become a popular learning resource on the Intel[®] Innovation in Education Web site, with more than 400,000 users each month. There is no charge for use, and the curriculum can be accessed from home or school on any computer with access to the Internet. The content is geared for students learning about science and technology in grades 5-9.

The new version retains the interactive, media-rich, self-paced learning approach while adding new information about recent technological advances. Classroom resources for teachers have been expanded, too. There is no need to register to use *The Journey Inside*. Other enhancements include:

- **Interactive lessons and activities:** New lessons use the interactive thinking tools available on the Intel Innovation in Education Web site. For example, a lesson using Visual Ranking, an interactive thinking tool for ranking items in an ordered list, helps students to better understand resistance and conductivity.
- **Improved delivery:** Online lessons and videos have been optimized to run more smoothly on a greater variety of computers. Now, students and teachers will be able to take advantage of everything the site has to offer, including virtual field trips. With these improvements, *The Journey Inside* becomes a virtual science museum Web site, full of interesting facts, videos, and activities teachers can select and arrange into their own online lessons for students.



The Journey InsideSM includes a complete curriculum for self-paced learning along with resources for teachers.

What Teachers Like

Technology raises many questions that come up in the classroom: How does the Internet work? What are microprocessors? How is electricity transformed into the images on the computer screen? These questions are all fundamental to understanding the Information Age, according to teachers who make regular use of *The Journey Inside* in their classes.

Lisa Stamper, a middle school teacher in Georgia, says she has been provided with no textbooks for her classes in business and information technology. "I use *The Journey Inside* to teach the objectives from my curriculum that have to do with understanding the functions of hardware, operating system software, networking, and the Internet as well as the effects and trends of technology on society," she says.

Stamper appreciates the learning style of the online curriculum. "The lessons are more customizable than textbooks, and they are interactive and interesting without security risks. I love the activities that let the students discover or apply information they just learned."

Teaching in a technology lab with Internet access, Stamper selects lessons from *The Journey Inside* that meet her learning goals. "I customize lessons based on my curriculum. After I introduce each lesson, the students can work together, alone, and at home to gain understanding of the concepts." To assess student learning, Stamper creates her own online quizzes.

Stamper says improved delivery of the videos will make a good curriculum even better. "The only parts of *The Journey Inside* that I purposely did not include in my lessons are the videos. The students were encouraged to view them, but I did not require the students to access them. Now that "the videos load faster and more reliably, I can include the content from the videos in my lesson requirements," she explains.

"Students need to understand that the computer is more than a box," says David Brear, a middle school teacher from British Columbia, Canada. "Before I teach them how to use software, I want them to understand what's happening inside the machine. What makes different images appear on the screen when they use a software application or go to the Internet?"

Brear selects lessons from *The Journey Inside* to use as group learning activities during a nine-week technology class that attracts diverse learners. "The kids love it. I have them write reflections, and many of them comment about how the videos helped them understand a concept," he says. "The content is excellent."

In addition to his middle school teaching, Brear also teaches educational technology to university students, many of them in a pre-service program. "These are new teachers, wondering what to do in their own classrooms. The panic is starting to set in," Brear says, with the chuckle of a veteran. He introduces them to *The Journey Inside* as a well-designed curriculum they can use with confidence with their students. "This gives them another set of resources," he adds. "It's another thing for their bag of tricks. For a new teacher, it's important to build that up."

For a look at the new and improved version of *The Journey Inside*, go to www.intel.com/education/journey.

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New Workshops Introduce Teachers to Thinking Tools

Participants Develop New Ideas to Use in Their Classrooms

For Bob Amses, a fifth-grade teacher in Phoenix, Arizona, an ongoing classroom challenge is drawing students into conversations that explore topics in depth. "Students are comfortable giving a short answer, a yes or no. What's lacking is the long discourse, the back-and-forth dialogue that encourages them to explain their thinking," he says.

Recently, Amses attended the new Intel® Teach to the Future Workshops on Interactive Thinking Tools and learned about *Visual Ranking* and *Seeing Reason*. The tools and associated resources, available on the Intel® Innovation in Education Web site, are designed to encourage students to develop higher-order thinking skills. *Seeing Reason* uses causal mapping to help students investigate cause-and-effect relationships in complex systems. *Visual Ranking* includes a collection of resources for ranking and comparing lists.

"As soon as I saw *Visual Ranking* demonstrated in the workshop, I thought it was incredible. It creates a necessity for discussion among students," says Amses, who teaches in a technology-enriched classroom at Kyrene del Milenio Elementary School. "I could see immediately how to use this to promote better discourse. It dovetails perfectly with what I'm trying to do as a teacher. I know it will be a huge part of my class in the coming school year."

Time for Sharing Ideas

The new workshops are designed to help teachers effectively integrate thinking tools into their learning projects. The face-to-face, hands-on format means teachers have the opportunity to use the online, interactive tools in a technology lab. The workshops, which last from eight and twelve hours, are led by Master Teachers, allow time for teachers to plan projects that meet their learning goals and to design assessments that measure results and are aligned to standards.

Julia Fischer, another recent workshop participant, said she appreciated having the time to brainstorm with fellow teachers. "Getting to collaborate with other teachers and explore ideas together takes you to a deeper understanding of how these tools could work in your classroom," says Fischer, a sixth-grade science teacher from Kyrene Akimel A-AI Middle School in Phoenix, Arizona.

Fischer was using *Seeing Reason* for class projects even before attending the workshop, but says she found the workshop discussions valuable. "You can go to the Web site and learn to use these tools on your own, but the workshop takes you to a deeper level," she says. "Your projects will get better as you understand the tools more fully."

Fischer also liked hearing other teachers' ideas. "The discussions helped me think of many different ways I could use these resources. I also appreciated having time to work with my curriculum and my standards, and produce a lesson that's ready to use in my own classroom—tomorrow."

Sustained Professional Development

For teachers already comfortable with using classroom technology, the workshops offer ongoing professional development and the spark of new ideas. Fischer, for example, has been teaching for 10 years, and teaching with technology for the past six years. "I'm always looking for new tools to use with my students," she says.

Amses began teaching three years ago, shifting from an earlier career in television and film. In 2002, he participated in the Intel® Teach to the Future Essentials Course, which gave him a good understanding of how to integrate technology into project-based learning. The new workshops are designed as a follow-up to the 40-hour Intel Teach to the Future Essentials Course.



Julia Fischer says workshops allow time for brainstorming and collaboration.



Bob Amses appreciates thinking tools that promote active class discussions.

Amses says he is deliberate about when and how to integrate technology. "It's best when applications serve the end result—the learning goal," he said. He brings technology into learning projects "when it helps to stimulate students' thinking, encourages them to collaborate, and helps with the display of their understanding."

Amses says he likes the thinking tools available from Intel Innovation in Education because they promote collaboration, inspire class discussions, and use visual representations to help students organize their thinking. "The process of creating a well-textured answer increases student understanding," he says. "Until students write down their ideas in a logical sequence, they don't fully understand. That's just as true in math as it is in language arts," he adds.

Students use the interactive tools to create graphic representations of their thinking. As students acquire new knowledge and their thinking evolves, the maps and rankings display the resulting changes in understanding. Comment features prompt students to explain their reasoning and create more opportunities for discussions with the teacher, as well as with fellow students.

Even for a veteran teacher like Fischer, using these powerful tools requires new classroom strategies. What has she learned? "As a teacher, you have to facilitate students' learning. Guiding questions are important, and it's important to be asking questions during the project and not just at the end," she says. For example, when using *Seeing Reason*, Fischer talks with students while they are making maps to represent cause-and-effect relationships. "It's important to get discussions going with students while they're making the maps. That's when you get to visualize their thinking," she says. The workshops allow experienced teachers to share their valuable insights with colleagues who may be newer to using interactive thinking tools.

After using *Seeing Reason* for several science projects, Fischer has started to notice a shift. "My students are giving more in-depth answers. Their thinking is going deeper. That's exciting."

To learn more about Intel Teach to the Future Workshops on Interactive Thinking Tools, visit www.intel.com/education/teach.

To access the interactive thinking tools available from Intel Innovation in Education, go to www.intel.com/education/tools.

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Harnessing Technology to "Transform Education"

Teaching Strategies and Examples From Intel CEO

When Intel CEO Craig Barrett addressed an overflow audience of educators at the largest annual educational technology conference, he outlined a three-part process for transforming teaching and learning so that today's students will master Twenty-First Century skills. Innovation, collaboration, and replication are key strategies that will enable teachers to "feed your students' passion for learning and let their creativity run wild," Barrett said in the keynote address at the National Educational Computing Conference (NECC), held in New Orleans in June.

The former Stanford University professor painted a global geopolitical picture to help the audience understand the urgency of improving education. Some three billion people from India, China, Russia, and Eastern Europe have now joined the free market economy, and that means "unprecedented competition" for U.S. students, he said.

Technology offers educators a powerful set of tools to make change happen in their classrooms. Today's technologies provide instant access to massive amounts of information; multimedia applications engage students in hands-on, active, inquiry-based learning; and communications tools build collaboration and expand communities of learners. However, Barrett focused on teachers as the "spark of transformation" to unlock students' abilities.

Teachers and the highly skilled technology workforce share the same need for sustained professional development, Barrett said, drawing applause with the reminder that "teachers are professionals." To continue expanding and adapting their skills in the classroom, teachers need access to effective tools and resources, support from leaders, and recognition and replication of good ideas, he said. Those are also the cornerstones of the Intel® Innovation in Education initiative.

Real-Life Examples

To show what Twenty-First Century learning looks like, Barrett invited a few tech-savvy educators and their students to join him on stage. Will Richardson, a technology specialist from Flemington, New Jersey, described how he uses weblogs as a tool to motivate his young writers and expand a high school journalism classroom by connecting online with experts who join the discourse. Vanessa Jones, a Master Teacher from Austin, Texas, explained how she has become more confident and competent about integrating technology into elementary classroom projects by participating in the Intel® Teach to the Future professional development program. Michael Hall from Warner Robins, Georgia, described how access to technology for teachers willing to embrace innovation has transformed "a regular high school" into the school that has become an international showcase Twenty-First Century learning. (See related story: [Top 20 U.S. Schools Honored for Excellence](#))

Barrett contrasted such learning experiences with his own education—in the days before global Internet access made finding information instantaneous. Unlike today's online learners, he had to "scrounge for references" in dusty library stacks. "Technology has changed the way we behave and created capabilities that were not there before," he said. Demonstrations, workshops, and special events during NECC introduced hundreds of educators to the free tools, resources, and professional development opportunities offered by Intel Innovation in Education. The global initiative helps today's students develop the thinking and problem-solving skills they will need to succeed in the Twenty-First Century. To learn more, visit www.intel.com/education.



Craig Barrett with Vanessa Jones and student at NECC.

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Top 20 Schools in U.S. Honored for Excellence

More Than US\$2 Million to Intel and Scholastic Schools of Distinction

Winners of the Intel and Scholastic Schools of Distinction Award program gathered in New Orleans, Louisiana, in June for two days of sharing innovative ideas, networking with new colleagues from across the country, and attending a black-tie dinner where grants and prizes totaled US\$2.3 million. The program was administered by Blue Ribbon Schools Foundation whose judges selected 20 of the nation's top K-12 schools from more than 1,200 applicants.

Two schools—Houston County High School in Warner Robins, Georgia, and MacArthur High School in Irving, Texas—were named Best of the Best winners. Comprehensive school improvement efforts at both schools have resulted in high-performing learning environments where technology is pervasive, leadership and community support are strong, and professional development is ongoing. Award-winners in nine individual categories and the Best of Best division represent a total of 13 states and "exemplify what is right with education in the United States," said Intel CEO Craig Barrett.



Craig Barrett presents the prize to winners from MacArthur High School.

Sharing Best Practices

The national award program is intended to showcase best practices in education that can be replicated by other schools. In keeping with that goal, the winning schools created short videos to share their innovative strategies during the awards event in June.

Michael Hall, principal of Houston County High School during its six-year transformation, explained how this "regular high school" in the heart of Georgia's farm country has become one of the most technologically advanced schools in the nation. A video made by Houston County High students captured glimpses of classrooms where teachers on a wireless campus use streaming video, interactive presentation boards, and other methods to engage 2,200 students in active learning.

Even the school farm and woodshop have been transformed by technology. Agriculture students conduct embryo transfers. Woodshop students use computer aided design software to design custom furniture, which they then build using traditional woodworking methods. The school even has a flight simulator to train students who want to become pilots. Creating this futuristic learning environment has meant both bringing in new equipment and "changing the whole culture of the school," Hall said. "You have to change how the students learn, how the teachers teach, and how the administration operates."

Tracie Fraley, principal of MacArthur High School, described the benefits of putting a laptop into the hands of every student and faculty member on the wireless campus in Irving, a suburb of Dallas. The school serves a racially diverse population, with nearly 40 percent of the 2,400 students meeting federal poverty guidelines and more than 60 languages spoken in students' homes. "We decided to level the playing field and give everyone equal access to resources which would enhance their education," Fraley explained.

Extensive professional development has helped teachers learn new strategies for using technology to meet learning goals. In the campus distance-learning center, for example, anatomy students have watched doctors perform total knee replacements and other surgeries—in real time. Videoconferencing enables students to ask questions of professionals and to expand their learning community beyond the boundaries of the high school.

Every school offered ideas worth borrowing. For example, at Bishop Dunne Catholic School in Dallas, Texas, students use GIS to create macro maps to solve community-based problems. Students apply their geospatial thinking skills to map crime data, helping police with prevention efforts, and have generated maps to assist with search-and-rescue-efforts at a nearby state

park. At Irmo Elementary School, housed in a 70-year-old building in Irmo, South Carolina, first- and second-graders use instant messaging to improve their reading and language arts skills.

Effective technology integration is just one strategy that has led to student success. Sherman Oaks Community Charter School in San Jose, California, shared video clips of a decidedly low-tech sandcastle contest designed to spark creativity. Cornerstone at Pedegral Elementary School in Rancho Palos Verdes, California, boasted of 100 percent parent involvement, with parents often acting as content experts for special projects.

Talbot Hill Elementary School in Renton, Washington, operates as a micro society, with students running their own legislative system, court system, television station, bank, and even a patent office for student inventions. Townsend Harris High School, located on the campus of Queens College, New York, teaches critical-thinking skills in a challenging curriculum that focuses on the humanities. "We offer great instruction, supported by technology and bolstered by character education," explained Principal Thomas Cunningham. The challenge issued to all students: Leave their city greater than they found it.

Picking the Winners

Blue Ribbon Schools of Excellence Foundation led the rigorous judging process. Each application was evaluated by multiple judges and site visits were conducted to narrow the top 56 schools to the 20 winners. Judges were looking for the implementation of innovative and replicable programs that support positive educational outcomes.

What did it feel like to be named one of the best schools in the country? "I'm walking on air," said Michael Hall of Houston County High School the day after the awards were announced. Attendees were treated to a riverboat ride on the Mississippi River and honored at a black-tie gala. One award-winning teacher said her favorite part of the experience was "the chance to get together with people from other great schools and exchange ideas."

To foster ongoing collaboration, Blue Ribbon Schools of Excellence is creating an interactive, online library of best practices to showcase effective ideas that other schools may want to replicate. To learn more, visit www.blueribbonschools.com.

More information about the Intel and Scholastic Schools of Distinction Award is available on the Intel® Innovation in Education Web site at www.intel.com/education/schoolsofdistinction.

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And the Winners Are . . .

Schools Showcase Best Practices in Education

Winners of the Intel and Scholastic Schools of Distinction awards, sponsored by Intel and Scholastic and administered by the Blue Ribbon Schools Foundation, shared some US\$2.6 million in grants and prizes. The two winners in the Best of the Best category each received US\$25,000. The 18 winners in nine individual categories each received US\$10,000. Each school also received prizes valued at more than US\$120,000, including curriculum materials, professional development resources, software, and hardware.

Category	Winning Award	Achievement Award
Best of the Best	Houston County High School Warner Robins, Georgia	MacArthur High School Irving, Texas
Technology Implementation	Irmo Elementary Irmo, South Carolina	Walnut Hill Elementary Dallas, Texas
Technology Excellence	Beachwood Middle School Beachwood, Ohio	Greenville Middle School Greenville, Tennessee
Teamwork	Arthur A. Coolidge Middle School Reading, Massachusetts	Kendale Elementary School Miami, Florida
Professional Development	Deer Creek Prairie Vale Elementary Edmond, Oklahoma	Sherman Oaks Community Charter San Jose, California
Innovative Use of Technology	Talbot Hill Elementary Renton, Washington	Bishop Dunne Catholic School Dallas, Texas
Involved Parents/Teachers	Cornerstone @ Pedegral Elementary Rancho Palos Verdes, California	Summit Elementary Ashland, Kentucky
Academic Excellence	Whitney High Cerritos, California	KIPP Academy Bronx, New York
Community Involvement	Townsend Harris High Flushing, New York	Abraham Lincoln High San Jose, California
Partnership	New Albany High New Albany, Ohio	Edith Sheuerman Elementary Garden City, Kansas

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Student Scientists Display Passion for Research

At Intel ISEF 2004, More Than 1,300 Student Finalists Shared the Spotlight

One student analyzed volcanic rocks from the deep ocean floor—a place she calls "the frontier of science." Another developed an improved method for generating high-quality, three-dimensional computer graphics. And a third used inexpensive materials, including the filament from an ordinary light bulb, to fashion his own, powerful version of a scanning tunneling microscope.

The trio of young scientists who earned the highest honors at the 2004 Intel International Science and Engineering Fair (Intel ISEF) share creativity, persistence, and a passion for scientific research. They come from three continents—Sara Rose Langberg from Fort Myers, Florida; Yuanchen Zhu from Shanghai, China; and Uwe Treske from Grafenhainichen, Sachsen Anhalt, Germany. At the awards ceremony in Portland, Oregon, in May, each grand-prize winner received a US\$50,000 scholarship along with a high-performance computer.

High school students from more than 40 countries qualify for Intel ISEF by winning at affiliated regional or national fairs. The chance to earn a share of US\$3 million in prizes adds to the excitement at the event, but many students describe even bigger motivations—curing cancer, designing fuel-efficient vehicles, being the first to solve a mathematical problem, or helping the blind have greater access to information.

The Intel® Innovation in Education Web site presents highlights from Intel ISEF 2004, including interviews with the grand-prize winners, award-winning science teachers, and student finalists from around the world. Read more at www.intel.com/education/isef/2004highlights.htm.

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Ask an Expert

Bart Teal Sees Awards as Springboard for Excellence in Education

Veteran educator Bart Teal predicts the Intel and Scholastic Schools of Distinction awards program will help to build "a system of greatness" in U.S. education. The program is sponsored by Intel and Scholastic, and administered by the Blue Ribbon Schools Foundation, which Teal founded. In June, after a rigorous review process involving more than 1,200 applicants, 20 schools won national recognition in 10 categories, including two Best of the Best winners. Winning schools shared US\$2.3 million in grants, but Teal says the value goes far beyond monetary rewards.



Bart Teal

What's the value of the Intel and Scholastic Schools of Distinction Awards Program?

"The motivation that the awards generate is one important piece of it. You're giving all schools the chance to aspire to that level of excellence—to be in the hunt for one of the top spots in the country. That's exciting. But if we want to build great schools, we need

to create a whole system of success. We need to identify the best practices and programs that work, and then let other schools know about them so they can implement these strategies to help their students. Then you've come full circle: the schools that win recognition help other schools learn how to use these best practices. That creates a whole system of improvement, and that's what this program will do. It's a road map to excellence."

What are the elements of a great school?

"We have drawn on 20 years of research into best practices in education and involved some of the top educators in the country to develop the criteria for this award. So, that's the starting place. There are definite similarities among outstanding schools. When you visit a great school, you see good things happening in every classroom. Every student is engaged in learning. There's tremendous energy and passion. Great teachers pull their colleagues up to this level. You find professional development, mentoring, collaboration, excellent communication, and effective leadership. The whole staff works together as a team, because they care about their students. Of course, the content, standards, and student achievement are important. So there are common elements, but no two schools are exactly the same. No two schools have the same culture."

How can schools go about identifying their own strengths and weaknesses?

"Through a self-study process schools can create teams of teachers, students, parents, administrators, community members, and even nearby university researchers. Together, they can look at every aspect of the school. You have to examine school culture, curriculum, leadership, after-school programs, achievement data—everything. It's all important to student success, but if you find that your school has a poor culture, then that culture has to be the first thing you work on to change."

Have you seen this process work before?

"Previously, I worked with the South Carolina Department of Education to help schools apply for the former National Blue Ribbon Program through the U.S. Department of Education (USDOE). Before 2002, that program involved a yearlong self-study process and lengthy application. I saw hundreds of schools use that process to make improvements. The USDOE program changed in 2002 to become the No Child Left Behind-Blue Ribbon Schools awards, which are based on achievement test scores rather than the self-study process. Blue Ribbon Schools of Excellence Foundation has created an assessment instrument that participating schools are now using for self-study, to create their own road maps to improvement. The foundation is also creating a searchable database of best practices that interested schools can use to identify strategies that will fit their school-improvement needs."

Schools applying for the Intel and Scholastic Schools of Distinction Awards Program select one of 10 categories to enter. Three of the categories focus on use of technology (Technology Innovation, Technology Excellence, and Technology Integration), and the Best of the Best winners are also expected to make effective use of technology. Why

this focus?

"Technology offers us the greatest opportunity to level the playing field for students all over this country. You can use technology to bring in resources, no matter how remote your school may be geographically or what your students' economic situation is at home. In schools that use technology well, you see students doing hands-on, project-based learning. They are solving complex problems and communicating effectively. I visited one school where a ninth-grade girl had used GPS mapping and done analysis of crime data to advise the local police department on where they should deploy their officers. I've been in schools where 40 percent of students meet poverty guidelines, yet every one has a laptop to use at home and at school. They can download videos, create graphs, do research, read online textbooks, connect to the Internet—get everything they need. Now, tell me that's not a great way to learn."

For more information, visit www.blueribbonschools.org.

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Meeting the Challenge

Intel® Teach to the Future Meets Rigorous Standards

In the United States, the No Child Left Behind (NCLB) Act of 2001 calls for high-quality professional development in technology as one component of national efforts to increase teacher quality and raise student achievement. A recent evaluation by experts finds that the Intel® Teach to the Future In-Service Program is closely aligned with NCLB's exacting criteria for high-quality professional development.

According to researchers at the Center for Children and Technology at the Educational Development Center, the Intel Teach to the Future program:

- Focuses on integration of technology into the standards-based curriculum
- Is based on research on effective instructional strategies
- Is designed to help teachers act on what they learn when they return to the classroom
- Aligns with both technology and instructional standards
- Sustains intensive professional development as NCLB requires
- Is continuously evaluated, which ensures the quality of professional development

The Intel Teach to the Future Essentials Course includes 40 hours of intensive, hands-on professional development. Participants learn to incorporate technology into project-based learning and create standards-based unit plans ready to use in their own classrooms.

To read more about the evaluation of NCLB and Intel Teach to the Future, including the full report from the Center for Children and Technology, go to www.intel.com/education/teach.

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Higher Education

Future of Computing Attracts Broad Academic Audience

Nearly 200 Attend Event in Barcelona

When Intel's top technologists get the chance to discuss the future of computing with university professors from more than 20 countries, the results are "extraordinary," according to participants in the ninth annual Intel Academic Forum, held in Barcelona, Spain, earlier this year.

"The Intel Academic Forum is an extraordinary opportunity to spend three days in the company of Intel's top research scientists discussing problems across the whole breadth of computer science, from device physics and manufacturing, through architectures and systems, to applications and usability," said Professor Peter Robinson of the University of Cambridge Computer Laboratory.



Forum participants continue discussions outside formal presentations.

This robust exchange of ideas is equally valuable for Intel researchers, according to Mark Harris, who directs Intel's higher education and research efforts in the European region. The annual forum offers an opportunity for industry leaders to talk with professors about research topics of high interest, such as architectural design. "Intel technologists talked about challenges they see out there in the next 10-15 years," Harris said. Answers to today's technology challenges may well come from university laboratories or through the research efforts of the current crop of Ph.D. candidates. "This event helps to build the pipeline for the future," Harris added.

Walter Tichy, professor of informatics at the University of Karlsruhe in Germany, said this year's forum "gave me insights into important future developments and helped me position and focus my own research."

Professor Thomas Gross of ETH (Eidgenössische Technische Hochschule) Zürich said Intel's ongoing support for university research "has allowed us to pursue topics that others at first did not find interesting. And we had the resources to implement the idea. When we had solid data, other groups became interested as well." In addition, Gross added, collaboration between industry and academia helps expose graduate students to "some real problems in compilers and computer architecture. Nothing beats real problems for inspiration."

Focus on Innovation

The theme for this year's event—Innovation in Technology, in Research, and in Curricula—echoed in the keynote topics delivered by Intel Fellows and executives to an audience of nearly 200. Pat Gelsinger, Intel chief technology officer, spoke about "Intel Driving Innovation in Technology." Gene Meieran, Intel Senior Fellow, discussed "Creativity, Innovation, and Collaboration." Stephen Pawlowksi, Intel Fellow, addressed the broad question, "Where Is Computing Going?"

The annual forum also aims to improve curricula by sharing the newest technologies with professors. "We move the newest technologies to faculty, who then introduce them to students," Harris explained.

To showcase innovative research efforts and curricula from universities spread across a broad geography, the forum included evening sessions where projects were on display "in an elegant way, like an art museum," Harris said. The poster sessions featured research projects and examples of technical curricula from more than 23 universities each evening. Attendees had time to circulate among the exhibits, asking questions, sharing ideas, and discussing the frontiers of computing. In all, 46 universities displayed more than 120 research and curricula projects.

Lasting relationships grow out of such events, Harris said, not only between Intel and academia but also among professors who live and work in different parts of the world. Economics and the opportunities for conducting leading-edge research can vary widely from

country to country.

Invited academic guests included professors from universities across Europe, along with Israel, South Africa, and Hong Kong. Invitees came from campuses that have a formal relationship with Intel, as well as universities located in sites where Intel conducts research and development, manufacturing, or other strategic efforts.

According to Dr. Martina Roth, director of education for Intel in Europe, the Middle East, and Africa (EMEA), the ninth Intel Academic Forum "has continued our multiyear tradition to be 'the best ever.' This year, in addition to our traditional higher education universities we have brought together all the universities that different Intel Research and R&D sites have been working with, and joined them into the Intel® Innovation in Education Academic Community." Roth said the resulting "richness and potential of this melting pot was very well seen, when more than 120 research and curricula projects were demonstrated and discussed."

To learn more about Intel Innovation in Education efforts in higher education, go to www.intel.com/education/highered/index.htm.

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Indian Undergraduates Tackle Research Challenges Intel Student Research Contest Encourages Innovation

A year of intensive research efforts culminated in May when eight undergraduate teams from India's select universities came together for the finals of the first Intel India Student Research Contest.

The winning team included student finalists Deepak Panwar and Deepak Sharma from the Indian Institute of Technology (IIT) in Kanpur. Their project focused on overcoming the limitations of device performance characteristics of organic light-emitting diodes for active-matrix flat-panel displays.

"The idea behind the contest was to stimulate and challenge undergraduates in the sciences and engineering disciplines to explore frontiers of future computing," explained Lokesh Mehra, education manager for Intel in India.

Preparation for the contest began a year earlier when undergraduates from 16 premier universities in India were invited to submit research proposals. Selected students received grants to conduct research with a college or university adviser. In addition, a technologist from the Intel India Development Center mentored each student team, providing technical guidance that enabled students to take their research deeper. From the original applicant pool, eight teams were selected to participate in the finalist project showcase, held in Bangalore.

The finalist showcase gave undergraduates the opportunity to present their original research to a panel of distinguished judges from Intel. The event began with students giving detailed presentations about their research, including a question-and-answer session with judges, mentors, and university professors. Students also gave project demonstrations for the judging panel.

In addition to the top prize won by the team from IIT Kanpur, a runner-up award went to Abhijeet Kumar and Nishit Tewari from IIT Guwahati for their project, "Providing End to End Quality of Service in Mobile Ad Hoc Networks." Joint second runners-up were Mayank Agarwal and Ankit Mathur from IIT Delhi and Saurabh Goyal and Mihir Choudhury from IIT Bombay.

Intel also sponsors similar events for undergraduates in the United States and China. To learn more about the Intel Student Research Contest, go to www.intel.com/research/awards/index.htm.



Undergraduates Deepak Panwar (left) and Deepak Sharma won top honors.

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Opportunities Abound

Panama City Clubhouses Open Doors for Local Youth

When two Intel Computer Clubhouses opened their doors in Panama City in May of this year, Panamanian youth turned out in droves. The Clubhouses, part of an after-school program for youth aged 10-18, offer access to high-tech equipment, professional software, and the guidance of adult mentors. They also offer youngsters the chance to develop valuable life and work skills, and have fun in the process.

Two local organizations host the new Clubhouses. La Parroquia de Fatima, a religious organization run by the Order of Mercy, serves the El Chorillo area of the city and offers social, cultural, and educational assistance to needy families and youth. The facility includes a trade school and orphanage. Fe y Alegría, a Jesuit organization located in the Bethania area, similarly provides educational and social assistance to families and youth in need. The organizations, now with the addition of high-tech computer Clubhouses, bring a wealth of opportunities to those who are otherwise without.



Clubhouse members learn to use technology to express their creativity.

Supporting the opening of the Clubhouses in his native country was Mariano Rivera, a Major League Baseball pitcher and five-time All-Star player from Panama. Rivera joined forces with the nonprofit Sports for Development Foundation to help improve education for youth in his home country.

"I am extremely proud to support the Intel Computer Clubhouses in Panama, and to help provide greater opportunities for Panamanian kids," says Rivera. "I know all too well that too many young people in my country grow up without being given a chance to get ahead. I believe the Computer Clubhouse will make a difference in many kids' lives."

Already, the two new Clubhouses have a combined membership totaling some 500 students.

José Solera, Latin American regional director for the Intel Computer Clubhouse Network, reports that many students have been doing work with graphics, exploring the high-tech side of drawing, painting, photography, and videography. They find the new graphics equipment and software exciting, and the opportunities for personal expression rewarding.

This includes Karla, a deaf teen who is so talented with computer graphics, she was selected to attend an international teen summit to showcase her talents.

"The Intel Computer Clubhouses are 'invention workshops' where youth can express themselves through their own interests to become designers, not just consumers, of computer-based creations," says Solera. "Clubhouse youth love using professional software for desktop design and illustration. It allows them to be creative, explore their world, and gain valuable skills for life and the workplace."

Some Panamanian authorities are already looking for ways to expand the Clubhouse network in Panama. At the Clubhouse openings, Solera says, there were "lots of questions from people as to what it takes to get one in their community."

In fact, Solera notes, one student was so excited that he and his friends now have a safe place to go and engage in constructive activities that the boy stated, "If there were more Clubhouses in Panama, there would be no poverty, no crime, and no hunger."

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Taking in the Campus

Clubhouse Members Visit Historically Black Colleges

Seventeen-year-old Dejeiner will be the first in her family to attend college—a big step, to be sure. So, to help her decide on a school where she will thrive, the Northern California teen went to the local Intel Computer Clubhouse where she is a member and signed up for a tour of historically black colleges and universities.

Intel Computer Clubhouse involvement in the tour was initiated in 2003 as a pilot project in California and rolled out nationwide this spring. The chance to participate in the tour is a recent addition to membership benefits for youth in underserved communities where Intel Computer Clubhouses are located.

The tour itself is not new. The Historically Black Colleges and Universities (HBCU) tour was organized by San Francisco Bay activist Carl F. Ray 17 years ago to motivate young black men to attend college. To date, more than 2,000 students, both male and female, have participated.

Linda Wells-Hott, the Intel corporate pipeline program manager, saw a natural link between the HBCU tour and two programs she manages: Intel's HBCU Initiative and the Clubhouse to College to Career (C2C) effort through the Intel Computer Clubhouse Network. She contacted Ray and began reserving spots on the tour for Clubhouse members recommended by Clubhouse managers as "college-ready."



Sharita talks with a tour guide in the Oakwood College slave cemetery.

The C2C project supports Clubhouse members in planning for the future and realizing their potential, whether that involves help with pursuing academic degrees or finding internships or other work opportunities. "It's a vital effort to contribute to Clubhouse youth in reaching their full potential. This event and other C2C efforts take the youth to the next step in utilizing the skills they have developed at the Clubhouse and transferring them into tangible, achievable futures in technology," says Wells-Hott. "Interacting with other youth from their communities who have used these opportunities to succeed has a positive impact beyond the Clubhouse, into families and communities."

Dejeiner was one of 21 California Clubhouse members who spent five days visiting the campuses of Clark Atlanta University, Oakwood College, Morehouse College, Spelman College, and Alabama A&M University last November. Then, in April of this year, another 41 students from across the country toured the same schools, plus the Civil Rights Institute in Birmingham, Alabama. Intel picked up the tab, which was a significant factor, as many of the youth involved would not have been able to afford expenses such as airfare and hotel accommodations.

Leroy Tripette, Intel's Folsom/Sacramento education manager and a Morehouse alum, served as a chaperone on the fall tour. He says the event provided some eye-opening moments for the students who took part.

"Students had the chance to see positive African American role models," says Tripette, to get away from the stereotypes of rap stars and professional athletes and meet others like themselves who are achieving their dreams of becoming engineers and scientists.

"One of the biggest 'Aha!' moments was when the students visited Oakwood and saw the slave cemetery there," says Tripette. These kids grew up in California, he explains, and this was the first opportunity for many of them to visit the Deep South and come face to face with their African American heritage. "It was very empowering for them," he says, "to see that they had the chance to take control of their future, to do something for themselves."

One of the students, Sharita, was so moved, notes Tripette, she filled out her application on

the spot, standing amidst the unmarked graves.

So far, several youth have been accepted to schools on the tour, reports Wells-Hott, and plans are underway to support Clubhouse members of any ethnicity interested in participating next year.

Dejeiner is planning to attend Spelman. "I want to be a good example for my younger brother," she says.

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