The Institute’s activities in education encompass a multidisciplinary program of coursework and experiential learning that reinforces the Institute’s theme. The educational program includes the disciplines of computer science and engineering, electrical and computer engineering, civil engineering, mechanical engineering, human factors, public policy, and others.

By sponsoring and supporting varied educational initiatives for students, the Institute is generating interest in its core ITS science and technologies. These initiatives include developing new curriculum and courses, involving undergraduate and graduate students in research projects, sponsoring students to attend national conferences, presenting awards that recognize outstanding students, and offering research assistantships to help attract more students to the study of transportation. This section of the annual report highlights some of our efforts in the area of education.

Transportation seminars highlight diverse ITS research
During the 2002–2003 academic year, the Institute continued its multidisciplinary seminar series at the University. These Advanced Transportation Technologies Seminars included a diverse set of presentations by local and national researchers addressing different areas of ITS research, such as traffic management and modeling, human factors, sensing, and intelligent vehicles as they relate to road- and transit-based transportation.

From the seminars, students learned about ITS technologies in areas outside their current field of study, researchers learned about other research projects in progress, and practitioners learned about the technologies of the future.

New this year, the seminar series was offered during the fall semester and was available as a one-credit graduate-level course. It was also a required course in the new Graduate Certificate Program in Transportation Studies at the University of Minnesota.

The past year’s presentations were:

- “Ramp Meters on Trial.” David Levinson, Department of Civil Engineering
- “Is the Sequential Travel Forecasting Paradigm Counterproductive?” David Boyce, Department of Civil and Materials Engineering, University of Illinois at Chicago
- “Wireless EMS Services: Opportunities and Challenges to Bringing Safety and Travel Services to Rural Minnesota.” Tom Horan and Frank Douma, Humphrey Institute of Public Affairs
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job market is tight,” said Abdel-al. “It’s the toughest part of a person’s life—graduating and looking for an entry-level position.”

About 75 students, from Minnesota and Wisconsin, and 18 exhibitors attended the expo, which provided job seekers advice for pursuing a variety of careers in transportation. Employers promoted their organizations through booths, and several company representatives led informational sessions.

The event offered a general session on career preparation and four concurrent sessions on specific areas of transportation: engineering/technical careers, transportation planning and policy careers, transportation logistics careers, and careers in intelligent transportation systems.

Student of the Year awarded to Robert F. K. Martin
Graduate research assistant Robert F. K. Martin received the ITS Institute’s 2002 Outstanding Student of the Year Award. He was recommended for the award by Nikolaos Papanikolopoulos, professor of computer science and engineering.

Martin, who earned his bachelor’s degree in electrical engineering from the University of Minnesota, is seeking his master’s in computer and information science. His current work is focused on the detection, tracking, and classification of vehicles using computer vision techniques. He was chosen for the award based on his contributions to addressing the problem of shadow removal for vehicle detection and classification.

Martin has held previous positions as a principal software engineer for Lockheed Martin–Technical Defense Systems and as a software engineer for MicroDynamics Corporation. This experience provided him with the programming background that has been invaluable to his current research for the ITS Institute.

Martin says he appreciates being recognized for the work he’s accomplished thus far, since as a graduate student, “there is your ultimate goal of getting a degree, but in between the beginning and the end, it feels like a lot of work goes unnoticed. Receiving this award was a large pat on the back.”

Martin plans to pursue a Ph.D. and then teach and conduct research in the area of computer science, specializing in computer vision and the cognitive workings of human vision. He received the award in January at the Transportation Research Board 82nd Annual Meeting in Washington, D.C. It was presented by Ellen Engleman, administrator, USDOT Research and Special Projects Administration, and J. Richard Capka, deputy administrator, Federal Highway Administration.

Institute student receives awards from CTS, FHWA
An ITS Institute student was one of two recipients of the 2003 Matthew J. Huber Award for Excellence in Transportation Research and Education. Lei Zhang is a doctoral candidate in the Department of Civil Engineering, concentrating in transportation engineering. He is advised...
by Assistant Professor David Levinson.

The award was presented by Cheri Marti, CTS assistant director, at
the center’s annual meeting and awards ceremony held in April in
Minneapolis. Zhang thanked CTS and Levinson, adding that the
award makes him feel he is doing something worthwhile for this
area of transportation and encourages him to contribute more to this
area of study.

The award is named in honor of the late Professor Matthew J.
Huber, in recognition of his contributions to the teaching and study
of transportation at the University of Minnesota.

Zhang also received the Milton Pikarsky Award—Science and
Technology during the annual Transportation Research Board meet-
ing in Washington, D.C., in January. Christine Johnson of the Federal
Highway Administration presented the award to Zhang at the
Council of University Transportation Centers Sixth Annual Awards
Banquet.

In Zhang’s thesis, Developing Efficient and Equitable Freeway
Ramp Control Strategies, measures of efficiency and equity for ramp
meters are defined and applied to data collected in the Twin Cities
ramp metering shut-off experiment of fall 2000. Zhang also devel-
oped an analytical framework for ramp metering under which future
ramp metering studies can be conducted.

Institute sponsorships help students attend national
conferences
The Institute grants travel awards to students so they can attend various
conferences to report on their research to a larger audience. This past
year, the Institute sponsored 11 students to attend the national meeting
of the Transportation Research Board (TRB) in January. The students
were Wei Chen, Wenling Chen, Joseph Keith Fortowsky, Andy Johnson,
Robert Martin, Jonathan Osmond, Tait Swenson, Haifeng Xiao, Wuping
Xin, Lei Zhang, and Xi Zou.

High school students experience ITS America annual
meeting
The University of Minnesota’s ITS Institute, 3M, and ITS America
partnered to sponsor a high school student competition held in con-
junction with the 2003 ITS America Annual Meeting.

The winning student teams, from Twin Cities-area Eastview and
Harding High Schools, joined the usual ITSA exhibitors to share
what they learned from the competition about the effectiveness of
ramp meters, having completed a Web-based curriculum on the
topic. The curriculum, which was created by the Institute, is aimed
at introducing students to ITS while having them practice their
research, data synthesis, and presentation skills.

The 3M Foundation provided stipends to the participating high
schools to offset their cost of attendance, plus an additional $1,000

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grant for each school. ITS America donated the exhibit hall space for the students.

While at the annual meeting, the students took time to visit the exhibits and meet with some of the ITS professionals in attendance, later commenting that the experience taught them more about intelligent transportation systems and its far-reaching effects.

The student competition is just one way the Institute is working to interest more of the best and brightest students in a career in intelligent transportation systems.

Web modules provide learning opportunity for high school students
A ramp meter module designed by the ITS Institute’s K-12 coordinator, Mark Tollefson, has been distributed to all Twin Cities metropolitan-area high schools and is being used by many teachers.

Students in physics, algebra, and statistics classes are using the computer-based curriculum that covers ramp metering theories and intelligent transportation systems concepts.

“It brings students the opportunity to learn about a subject most people know very little about,” said Tollefson. “I think informed students today will make informed taxpayers in the future.”

The youth, who also learn about ITS careers through the module, “could become the ITS workers of tomorrow,” he said.

By reaching students with engaging, hands-on activities, the Institute hopes to spark an early interest in transportation.

“I like this unit because I get to use the computer, get to learn about cars, and I can work at my pace,” said a student who explored the module in a test group.

Additionally, Tollefson has designed a Web-quest curriculum on global positioning systems that is currently at the review stage. Along with listing various Web sites about GPS, the curriculum includes quizzes that check students’ learning progress. The unit can be used in the same courses as the ramp meter module as well as in earth science and physical science courses. The GPS module will be distributed and available on the Institute’s Web site during the first quarter of FY04 (check www.its.umn.edu/education for updates).

The ramp meter module can be accessed at www.its.umn.edu/education/rampmodule/index.html.

Lab opens door to ITS career
When recent graduate Kyle Wood began his internship with the Center for Transportation Studies his sophomore year, he had no interest in transportation. Although the electrical engineering student was hired for administrative-related duties, his background and a budding interest led him more and more into helping out in the ITS Lab across the hall. Soon he was “adopted” by the lab.

Two and a half years later, Wood is pursuing a full-time engineering job in ITS technology with a resume stacked full of skills and original
project work he’s developed at the Institute. His experience in assisting research fellow John Hourdakis on the Beholder project has been so extensive that Wood is only halfway through writing an over 50-page how-to manual on what he does.

“I’m really the only one that knows the ‘ins and outs’ of how the entire system is working,” he said. Wood helped design Beholder’s wireless infrastructure, using an 802.16 protocol, for traffic data transmission from Autoscope® vehicle detection systems—a challenge because he had to deal with conversions using different protocols. His other major accomplishment for the project was building four dedicated, fully automated video encoders to capture and broadcast the video over a 20Mbit wireless network back to the lab.

The Beholder experience became instrumental to Wood’s senior project, titled Video Compression over Limited Bandwidth Channels, which couldn’t have covered a more related subject. For the project, Wood and his four group members spent a lot of time using the ITS Lab—a valuable resource available to any undergraduate student working on a transportation-related assignment.

Other work experiences also spilled over into Wood’s classroom learning, including the PCB (printed circuit board) he built for Beholder’s initial communications equipment, and the use of stereo imaging and ultrasonic motion tracking when helping Ted Morris design and construct the lab’s Digital Immersive Environment (DEN) for investigating novel human interfaces.

“We are always learning and doing new things here,” Wood said, adding that he couldn’t have chosen a better place to work. “The experience I’ve gotten has been phenomenal.” Together with the contacts he’s made, Wood said he’s on excellent footing for his career. “I owe it all to the ITS Institute.”

**Interactive simulations enhance ITS education, outreach**

At the ITS Laboratory, work is underway to make traffic simulation tools more widely available. Senior Systems Engineer Chen-Fu Liao is working to give researchers, students, and eventually the public access to advanced computer-generated traffic simulation systems that would allow users to experiment with traffic flow on the streets of Minneapolis, for example.

Traffic simulators are important tools in ITS research because they enable researchers to study the effects of ITS technologies in the laborato-