The ITS Institute’s education activities consist of a multidisciplinary program of coursework and experiential learning that supports 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 supporting and sponsoring a variety of 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, giving 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.

**Seminar series highlights varied work in ITS**

This was the sixth year that the Institute sponsored the multidisciplinary Advanced Transportation Technologies seminar series at the University. These seminars feature presentations by local and national researchers addressing diverse areas of ITS research such as traffic management.

*Rob Foss, University of North Carolina, with Institute director Max Donath. Foss discussed how teenage and other driver behavior contributes to crashes during an advanced transportation technology seminar.*
and modeling, human factors, intelligent vehicles, sensing, controls, communications, and policy issues as they relate to road and transit-based transportation. At the seminars, researchers report on recent findings from their work and bring new information to the ITS community.

This seminar series, which is a required course in the University's Graduate Certificate Program in Transportation Studies, is offered as a one-credit graduate-level course, or attendees can earn one professional development hour for each seminar. Presentations are recorded onto DVD and are available for loan by request.

The past year's seminars were:

- “Developing ITS to Serve a Diverse Population,” Frank Douma, assistant director, State and Local Policy Program, Hubert H. Humphrey Institute of Public Affairs

- “Addressing the Driver's Role in Motor Vehicle Crashes: Past Failures, Future Successes,” Rob Foss, senior research scientist and manager of alcohol studies, Highway Safety Research Center, University of North Carolina

- “Development and Evaluation of a Novel Traffic-Friendly Commuter Vehicle,” Rajesh Rajamani, professor, Department of Mechanical Engineering

- “Toward Scalable and Privacy-Aware Location-Based Services in Transportation,” Mohamed Mokbel, assistant professor, Department of Computer Science and Engineering

- “Portable Video Data Processor,” Nikolaos Papanikolopoulos, professor, Department of Computer Science and Engineering

- “Collective Responsibility in Freeway Rear-end Collisions—An Application of Causal Models,” Gary Davis, professor, Department of Civil Engineering

- “Where is the U.S. VII Program Going?” Ron Heft, senior principal engineer, Nissan Technical Center-North America

University team places high at annual Intelligent Ground Vehicles Competition

A year's worth of hard work paid off for a team of University students at the 15th annual Intelligent Ground Vehicles Competition in Rochester, Michigan. Mechanical engineering master's students Eddie Arpin and Rich Hoglund, along with computer science doctoral student Seth Berrier, took second and fourth place in two of the June competition's three categories with their robot vehicle, AWESOM-O. There were 36 other teams in this year's competition.

Arpin and Hoglund became involved with the project when they were students of Professor Max Donath, who told his class about the competition. The two contacted Berrier and began planning their vehicle in June 2006.
With funding from the ITS Institute, the team worked to design a vehicle that would meet the contest’s criteria. There were two primary challenges. The autonomous challenge, in which the team placed second, required the vehicle to move around an outdoor obstacle course under a prescribed time limit while traveling no faster than 5 mph and avoiding obstacles on the track. Judges ranked the vehicles based on the adjusted time each one took to complete the course. The navigation challenge, in which the team placed fourth, required the vehicle to travel from a starting point to a number of target destinations and return to home base, given only the coordinates of the targets in latitude and longitude. Finally, the vehicles were judged in a design competition based on a written report, oral presentation, and examination of the vehicle.

The team outfitted the 220-pound vehicle with several features. A camera served as the robot’s “vision,” enabling it to see objects and lines painted on the track. Since that provided only 2-D vision, AWESOM-O was also outfitted with a laser measurement system that allowed the vehicle to know what objects were around it and how close they were. In addition, the robot also used GPS and a digital compass for location and vehicle heading information.

The team’s placement this year is significantly higher than that of the last team that represented the University in 2005, which placed 8th in the autonomous challenge and 11th in the navigation challenge.

“Were happy with the quality of our robot compared with the other teams,” Arpin said of his team’s vehicle. “I think it went as well as it could, since it was our first year in the contest.” Donath, who served as the team’s adviser, was pleased with the team’s performance. “They worked very well as a team. I’ve really never seen three people work so well together.”

Arpin said the team is considering entering the competition again next year, but would need to recruit a few more team members, as the project would be too big for the three of them to undertake again.

Kokotovich named Student of the Year
Adam Kokotovich received the ITS Institute’s 2006 Outstanding Student of the Year Award at the annual TRB meeting in Washington, D.C., in January. Kokotovich was also recognized at the annual Center for Transportation Studies award luncheon and ceremony, held in Minneapolis in April. Kokotovich is working toward his master’s degree in science, technology, and environmental policy. His research focused on emerging technologies and their social and ethical implications, including privacy concerns related to some ITS technologies. His advisor, Lee Munnich of the Humphrey Institute, said Kokotovich did “more than an outstanding job” on the privacy-related research. Kokotovich said he was pleased to be involved so that “the full potential of ITS technology can be realized.”

Huber Award goes to ITS students
The Matthew J. Huber Award for Excellence in Transportation Research and Education was awarded this year to two students involved in ITS research. Michael “Mick” Rakauskas, a research fellow with the HumanFIRST Program and a Ph.D. candidate in the psychology department, was nominated by Nic Ward, director of HumanFIRST. Ward said Rakauskas “balanced lots of responsibility with grace and humor.”

The other recipient was Xiaozheng “Sean” He, a second-year graduate student pursuing both M.S. and Ph.D. degrees in the Department of Civil Engineering. He is advised by assistant professor Henry Liu, who said He’s unique background in mathematics helped in tackling transportation network modeling.

TEL grant brings traffic signal simulators online
Work began in June 2007 on a project that Henry Liu, assistant professor of civil engineering, envisions as an “active textbook.” Through an interactive Web-based traffic signal simulator dubbed OASIS (Online Application of Signalized Intersection Simulation), transportation students will be
able to realistically experiment with complex signal logic without worrying about banging up cars. Until now, the alternative for students has been textbook reading and calculating equations, but with OASIS they'll develop different strategies and watch how traffic reacts in real time. After Chen-Fu Liao, senior systems engineer with the Minnesota Traffic Observatory, develops the module, the simulator will go before one of Liu's classes for testing and evaluation in March 2008.

A $10,000 Technology-Enhanced Learning grant (matched by the ITS Institute), along with additional civil engineering department funding, will support the year-long project. The University of Minnesota's Academic Affairs and Information Technology offices award the grant each year to select university instructors with proposals to integrate technology and education.

Over the last year, Liao and associate professor of civil engineering David Levinson developed a similar project, a Web-based roadway geometry design tool they dubbed ROAD (Roadway Online Application for Design). ROAD lets students design and easily modify a roadway design with given economic and environmental parameters. A 3-D roadway geometry model can be generated by the software to allow students to put themselves in the driver's seat and drive through the designed roadway at a maximum speed. ROAD was deployed and tested in civil engineering undergraduate classes in spring and fall semesters of 2006 and spring 2007.

### Speaker addresses teen driving challenges, potential solutions

The ITS Institute sponsored the CTS Winter Luncheon in February, where speaker Bruce Simons-Morton discussed ways technology may help improve teenage driving.

Simons-Morton is chief of the Prevention Research Branch in the Division of Epidemiology, Statistics, and Prevention Research at the National Institute of Child Health and Human Development, National Institutes of Health.

Inexperience is the root of the young driver problem, and one of the most promising ways to solve it is graduated licensure, Simons-Morton said. Used in many states, GDLs impose limits on night driving, passengers, and other behaviors.

Another solution is more effective parent management, such as limiting night driving, passengers, and the types of roads novices can use (to those under 55 mph).

Institute director Max Donath, who introduced the presentation, and his research team are also conducting research on teen driving.

### Institute funds student travel

This past year, the Institute sponsored eight University of Minnesota students to attend and participate in the national meeting of the Transportation Research Board in Washington, D.C. The students were Xiaozheng He, Saif Jabari, Wenteng Ma, Ryan Wilson, Xinkai Wu, Feng Xie, Wuping Xin, and Shanjiang Zhu.

In addition, Mick Rakauskas was given a travel award to attend and present at the 4th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design.