

The *Transportation Education E-News* is a semiannual electronic newsletter from the Center for Transportation Studies at the University of Minnesota. It's designed to inform university faculty of tools, initiatives, and activities for improving transportation education, especially in the field of transportation engineering. This newsletter is sponsored by the [Center for Transportation Studies](#), the [Intelligent Transportation Systems Institute](#), and the [STREET](#) (Simulating Transportation for Realistic Engineering Education and Training) project.

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## Transportation wikibook offers students free, dynamic textbook

For the past two years, undergraduate students enrolled in the University of Minnesota's introduction to transportation engineering course have spent less time paging through textbooks and more time browsing the web. Instead of purchasing a traditional textbook, these students use the online [\*Fundamentals of Transportation\*](#) wikibook as their primary course text.

Civil engineering professor **David Levinson** created the wikibook as part of the [\*Simulating Transportation for Realistic Engineering Education and Training\*](#) (STREET) project at the University of Minnesota, funded by the [\*National Science Foundation\*](#) with matching support from the [\*Intelligent Transportation Systems \(ITS\) Institute\*](#). Research fellow **Adam Danczyk**, civil engineering professor **Henry Liu**, graduate student **Michael Corbett**, University of California, Berkeley professor **William Garrison**, and Oregon State University professor **Karen Dixon** contributed to the book's creation and content.

The wikibook is divided into three major units—planning, operations, and design—following the curriculum of the introductory course. Within those sections, topics include forecasting traffic demands, queueing, traffic flow, earthwork, and curves.

According to Liu, each section contains descriptions of the critical concepts students need to master, as well as examples, exercises and questions related to each topic. Also included are links to six web-based simulation modules created as part of the STREET project to provide students with a hands-on, interactive learning experience. The book's well-developed content and organization earned it a "featured book" distinction on Wikibooks in April 2010.

The decision to compile this information in wikibook format was motivated by several factors, Levinson said. First, he noted, the wikibook is dynamic and can be easily updated and maintained by several editors and authors. Protections in place by Wikibooks require an experienced editor to approve proposed changes, ensuring that anyone can contribute while also minimizing vandalism. Another advantage is that the wikibook is free and available to everyone with Internet access.

"Students appreciate the low cost," Levinson said, "and that it tracks very closely with what we teach. Paper textbooks are generally quite expensive, and most of them are irrelevant for the course at hand." Information in the wikibook, on the other hand, is tailored to the needs of an introductory course. Updated information can be added at any time, and students never have to purchase a new edition.

Levinson said he hopes more schools will use the wikibook in their introductory courses in the future. He would also like to see the addition of "more visualizations and other tools to help students understand the underlying mechanisms." Additional sections and modules covering new topics would also enhance the book, Levinson said, as long as it remains "clear and focused" on its purpose as an introductory text.

- View the [\*Fundamentals of Transportation\*](#)

## **Students control traffic signals in online module**

When teaching traffic control in an undergraduate course, one of the central components is how signal control works in the real world, according to University of Minnesota civil engineering professor **Henry Liu**. To help students understand signal control logic and enrich their learning experience in signal timing and control, Liu and **Chen-Fu Liao**, educational systems manager at the [Minnesota Traffic Observatory](#), developed an online module that simulates a vehicle-actuated traffic signal.

The Online Application for Signalized Intersection Simulation (OASIS) module assists students in becoming comfortable with vehicle-actuated signal control, a topic Liu said students often have difficulty with. Vehicle-actuated signals, commonly used at urban intersections, rely on detectors in the intersection to allocate “green time” depending on traffic demand at each approach. In the OASIS module, students click on areas of the screen to indicate the presence of vehicles and trigger the actuated signal.

When using OASIS, students must first input basic information about the intersection, such as the number of lanes in each approach, the speed of incoming vehicles, and the number of vehicles passing through the intersection per hour. Students then configure traffic demand settings, indicating the percentage of vehicles turning either left or right or proceeding straight through the intersection. Lastly, signal timing data, such as minimum and maximum green time, is input using an interface that replicates a real-world traffic controller.

As students click on the detector boxes in the simulation, clocks display the signal time data, and the traffic signals change based on the location of the vehicles and previously entered data. Students are then able to witness how traffic signal combinations change depending on traffic demand and the timing requirements they entered. The simulation is designed to help students understand the logic behind the vehicle-actuated system, Liu said, as well as prepare them for field experience.

The OASIS module was completed as part of [Simulating Transportation for Realistic Engineering Education and Training](#) (STREET) project at the University of Minnesota. The STREET project is funded by the [National Science Foundation](#) with matching support from the [Intelligent Transportation Systems \(ITS\) Institute](#).

## **Traffic Signal education workshop at TRB Annual Meeting**

The Transportation Research Board (TRB) Traffic Signal Systems Committee is holding an all-day workshop on "Educating Transportation Engineers" at this year's TRB Annual Meeting on Sunday, January 23 at the Marriott at 9:00 a.m.

The workshop will examine best practices and innovations in traffic signal education and training, and identify what students, engineers, and technicians need to know and understand about traffic

signal systems, the available resources to improve skills and competencies in practice, and how the Traffic Signal Systems Committee can encourage development of educational materials, curriculum, tools, and activities to improve education and training in traffic signal systems.

Presentations include:

### **Innovations and Best Practices**

- Henry Liu, University of Minnesota, “STREET: Simulating Transportation for Realistic Engineering Education”
- Peter Koonce, City of Portland, “Transportation Engineering Applications: A Course for Future Practitioners with a Focus on Signal Timing and Multimodal Policies”
- Steven Click, Tennessee Tech University, “The (Disappointingly Commonplace) Traffic Signal Content in TTU’s CEE Undergraduate Program”
- Ed Smaglik, Northern Arizona University, “Best Practices in Signal System Education: Applied Concepts”
- Zong Tian, University of Nevada, “Cycle Timer—A Tool for Signal Timing Field Implementation”
- Anuj Sharma, University of Nebraska, “Teaching Traffic Signals: An Instructor's Retrospective”
- Eddie Curtis, Federal Highway Administration, “Traffic Signal Operations/Training Roadmap”
- Michael Kyte, University of Idaho, “Visualizing Traffic Control Processes”

### **Perspectives of the Profession**

- Susan Langdon, Savant Group (moderator)
- Peter Martin, University of Utah

### **The MOST Curricula**

- Michael Kyte, University of Idaho, “The University of Idaho Signal Timing Curricula and Visualization Projects”
- Paul Olson, Federal Highway Administration
- Rick Denny, Federal Highway Administration

### **The National Transportation Curriculum Project**

- Andi Bill, University of Wisconsin, “Project Overview”
- Rhonda Young, University of Wyoming, “Geometric Design”
- Dave Hurwitz, Oregon State University, “Human Factors”
- Rod Turochy, Auburn University, “Traffic Operations”
- Laura Sandt, University of North Carolina, “Planning/Bicycles/Pedestrians”

### **Transportation Education Development Pilot Program: The Region X Consortium Distance**

## **Education Curriculum Development Project**

- Kelly Pitera, University of Washington
- Ashley Haire, Portland State University
- Ming Lee, University of Alaska
- Clark Martin, Federal Highway Administration

—*Michael Kyte, University of Idaho*

## **TRB Transportation Education and Training Committee activities at TRB Annual Meeting**

The transportation industry is facing a workforce crisis. The current and emerging transportation system needs people with skills in management, administration, policy, planning, engineering, construction, operations, and maintenance. Addressing this issue is a priority for the Transportation Research Board (TRB).

Over the past five years, the TRB Transportation Education and Training Committee, in association with a number of other committees, has sponsored an Annual Meeting workshop, *Building the 21st Century Workforce: Mission-Critical Issues, Cross-Modal Opportunities, and Key Partnerships in Transportation Workforce*. The developers of the workshops strive to involve the many others in the transportation industry—governments at many levels, industry and professional associations, the academic community, labor unions, and consultants—who also have made workforce development a focus.

This year's workshop will be held at the TRB Annual Meeting on Thursday, January 27, 2011. This workshop continues the Annual Meeting tradition of exploring the 21st century workforce. A workforce with the needed skills across the full spectrum of development to operations is the most significant factor in transforming America's transportation infrastructure into a truly multimodal system that provides travelers and businesses with safe, secure, efficient, and environmentally sustainable transportation choices.

This year's workshop will explore workforce development from a variety of modes and perspectives. **Shashi Nambisan** of Iowa State University will offer his perspective on regional workforce summits, **Monique Stewart** of the Federal Railroad Administration will talk about challenges and opportunities in the rail workforce, and panelists with industry perspectives will talk about operational workforce development issues. We will also hear reports of national transportation workforce development activities from RITA/UTC.

Complementing the workshop will be three sessions organized or co-sponsored by the Transportation Education and Training Committee.

- Session 416 - Critical Knowledge Management Needs and Issues for Transportation Agencies (Jan. 24, 7:30 p.m.)

- Session 652 - Emerging Learning Concepts and Formats in a Traditional Undergraduate Classroom Education Setting (Jan. 26, 8:00 a.m.)
- Session 704 - Transportation Education and Training Beyond the Traditional Classroom (Jan. 26, 10:15 a.m.)

Anyone interested in getting involved with the committee activities is welcome to attend the Committee Business Meeting on Monday, January 24, from 10:15 a.m.-noon at the Hilton.

For further information, contact the co-chairs of the TRB Transportation Education and Training Committee: Greg Benz ([benz@pbworld.com](mailto:benz@pbworld.com)) and Chandra Bhat ([bhat@mail.utexas.edu](mailto:bhat@mail.utexas.edu)).

—*Greg Benz and Chandra Bhat*

### **ITE Collegiate Traffic Bowl season starting soon**

The 2011 Traffic Bowl season starts soon with the first district events being held in March 2011. The ITE Collegiate Traffic Bowl is a competition among ITE student chapters, similar to game shows such as the College Bowl or Jeopardy, but with transportation planning and engineering topics for the clues, questions, and answers. The district winners will compete in the Grand Championship to be held at the ITE International Annual Meeting and Exhibit from August 13-16, 2011 in St. Louis, Missouri, USA. The winning team in the 2011 Grand Championship will receive \$2,000. See the [ITE website](#) for the current schedule of these events, as well as the rules and instructions for participating.

The 2010 Grand Championship was an inaugural event for the ITE Collegiate Traffic Bowl. In 2010, student teams from 46 universities in the United States and Canada competed in nine district-level events for a chance to compete in the Grand Championship in Vancouver, BC, Canada. More than 135 student members of ITE participated in teams that competed over seven months leading up to the Grand Championship. Texas A&M University won the 2010 Grand Championship.

- [Visit the ITE Collegiate Traffic Bowl website](#)

### **National Engineers Week Future City Competition gearing up**

The National Engineers Week Future City Competition® ([www.futurecity.org](http://www.futurecity.org)) is a program developed for 6th, 7th, and 8th grade students to help them discover and foster interests in math, science and engineering. Regional competitions are scheduled during January 2011. The first place teams in the regional competitions will travel to Washington, D.C. to participate in the

national finals during National Engineers Week, February 18-22, 2011. The winning team will be announced immediately after the national finals.

The National Engineers Week Future City Competition® is an example of problem-based learning with computer simulation. It is an integrated, multidisciplinary, holistic approach to relevant issues and is a strong example of STEM (Science, Technology, Engineering, & Mathematics) education that addresses national and state academic content standards. The program asks 6th, 7th, and 8th grade students from around the nation to team with engineer-volunteer mentors to create—first on computer and then in large, three-dimensional models—their visions of the city of tomorrow.

- [Visit the Future City Competition® website](#)

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### **Comments**

We would like to hear what you think of the *Transportation Education E-News*. Please e-mail us at [cts@umn.edu](mailto:cts@umn.edu).

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