NIATT

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Technovations in Transportation

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NIATT Receives FHWA Education Grant

Members of the Region X of University Transportation Centers have a roll in the Transportation Education Development Pilot Program awarded by the Federal Highway Administration to NIATT in the fall of 2008.

Working in three distinct teams, faculty from the University of Idaho, Portland State University, University of Alaska (Fairbanks) and University of Washington will develop four course modules. These modules will be developed in a unique distance-based learning environment. The efficacy of the modules in meeting program goals and providing a means to disseminate materials and lessons learned to a national audience will be tested.

What Will a Ten-Week Course Module Look Like?

The modules will be learner-centered, built upon the researchers' extensive experience in creating active, problem-based learning environments for our transportation students, and validated by pedagogical research funded through the National Science Foundation and others. Too often, transportation courses focus on the use of a particular tool, such as traffic simulation or transportation planning models. Research has shown that reorienting a course to focus on a generative problem, then allowing the student-instructor teams to develop the material needed to solve the problem, builds not only the technical skills required but also the communication and collaboration skills needed in today's work environment. A substantial body of research has shown that the outcomes from such learner-centered environments are more significant than those produced by more traditional educational approaches.

A course module would begin with a two day on-site workshop involving the participation of the instruction team and all students. During this workshop, the generative problem will be described and the process and schedule to address the problem will be developed. Team building exercises will be conducted to develop communications and work group processes that will be used during the course. The instruction team will present the learning objectives that will guide the course and the available tools for addressing the problem.

Subsequent to the initial workshop, weekly two-hour meetings will be held during the ten-week course via video conferencing facilities. Mini-teams will be formed at each video conferencing site. Mini-lectures (about 20 minutes in length) will be presented in which a specific sub-problem for the week will be described.

Enhanced learning and self-assessment skills will contribute to the creation of an engineering workforce of "life-long learners." According to the National Academy of Engineering, this is an imperative for the 21st century.

The remaining class period will be focused on participant teams working on the problem and developing material to address the assigned problem. Selected student teams will summarize the work completed during the class. Students will prepare for each subsequent class through assigned readings, group problems, writing exercises or reflective self-assessment.

An electronic environment will provide the tools for instructors and participants to collaborate and communicate. Video conferencing will be used for all class meetings. All course materials will be stored on the class website. Webinars, wikis, threaded email discussion groups and instant messaging tools will also be available.

Nick Harker--NIATT Student-of-the-Year

2009 Student-of-the-year, Nicholas Harker, has been an outstanding student (he was named Mechanical Engineering's Outstanding Senior in May 2007), an outstanding leader in the IEWorks as amentor, and an outstanding member of the UI's Clean Snowmobile Team.

Nick Harker is a mechanical engineering graduate student at the University of Idaho, working with NIATT and the UI Clean Snowmobile Challenge (UICSC) Team. Nick received his BS in mechanical engineering in May 2007 and his MS in May 2009. Nick will begin work at INL in the summer of 2009.

He has been involved with the UI-CSC Team for the past five years and is now their graduate student mentor, leading the engine development and calibration efforts for the team. His senior capstone team designed, fabricated, installed, tuned and tested a direct injection cylinder head for a two-stroke snowmobile engine which doubled fuel efficiency and reduced emissions 80-95 percent.

While Nick was the team captain in 2007, the team placed first overall in the national SAE Clean Snowmobile Challenge and won many additional awards.

The team was awarded the Most Sportsmanlike trophy after Nick stopped the Idaho snowmobile in the middle of the Challenge to help a competitor whose snowmobile was on fire.

Nick's graduate research centers on engine design, development, and calibration for ethanol-gasoline blended fuels. This work is focused on improving emissions, efficiency, and power output. When not at school or work, he enjoys modifying and riding motorcycles, snowmobiles, and other motorized vehicles.

NIATT Participates in Region X Activities

Region X Student Conference

NIATT graduate students participated in the Sixth Annual Region X Student Conference held at the University of Washington on November 7, 2008. The annual conference provides a forum for the graduate students to share their research with each other as well as make connections with each other and representatives of the sponsors, transportation professionals from the Northwest.

TRB Reception

NIATT, along with the UTCs from University of Alaska, Fairbanks, Portland State University, and the University of Washington, hosted a reception at the 88th Annual Transportation Research Board meeting in Washington, DC, in January 2009. Representatives from the four UTCs were there to talk to

guests about the research being done in their centers of excellence.

Transportation Education Conference Set for June 2009

A three-day program to help plan the future of transportation engineering education is scheduled to take place in Portland, Oregon, on June 22-24, 2009. The conference is being sponsored by the Region X UTCs along with the Institute of Transportation Engineers and the Council of University Transportation Centers.

Three goals have been set for the conference attendees:

1. Learning about the latest ideas in transportation education engineering education;
2. Addressing important questions to help improve the delivery of transportation engineering education; and
3. Learning how to improve teaching skills.

Registration is open at **www.webs2.uidaho.edu/transportation_education_conference-2009**.

Plan to attend and/or to share your current work and innovative ideas at a poster session.

Research Progress--Crossing the Street Safely

For the 21.2 million Americans who suffer from vision loss, crossing the street can be a stressful and potentially dangerous proposition. However, thanks to NIATT researcher Richard Wall and his team of graduate and undergraduate students, many visually impaired individuals may soon have a greatly reduced risk thanks to a tool already in their pockets--their cell phone.

The statistics for vision loss, provided by the American Foundation for the Blind, includes anyone reporting difficulty seeing even while wearing glasses or contact lenses. No matter the level of visual impairment, many conditions including visual noise, walking at night and irregular intersections can result in missing the crosswalk. Regardless of any condition, the new system being developed in Moscow, Idaho will make intersections safer and easier to navigate.

> "Minute for minute on the road, any pedestrian is 150 percent more likely to be injured by a car than somebody driving one," said Richard Wall, professor of electrical and computer engineering. "But it is pretty apparent that the blind pedestrians are the ones most at risk at intersections."

The new technology utilizes features already available in many cellular phones including communications, Global Positioning Satellite (GPS) functions and magnetic compasses to help visually impaired pedestrians. Specialized software allows these pedestrians to activate the crossing signal remotely without having to locate the physical button.

Then, the GPS system monitors the position and direction of travel during crossing. As long as the crosser stays within the crosswalk, nothing happens. But stray outside the lines, and an audible warning activates alerting the pedestrian of their danger, and provides directions on how to get back within the safety zone. Should the walker somehow end up in the middle of the intersection, the system would automatically turn every light red to stop traffic and avert a potential disaster.

"It's true that this would disrupt the timing of the signal patterns when it gets activated," said Wall. "But

we would much rather disrupt them for a few seconds than for a half hour while an ambulance assists a traffic victim." To ensure people don't trigger the alarm just for fun, only those who need the help would be able to acquire the necessary software. The system requires more than software, however.

It also requires the installation of new hardware in thousands of lights across the country. Luckily, Wall and his team have found a solution that is not only cost effective, it simplifies the existing system. Many crosswalks currently have handicapped-assisted signals that provide help such as audio tones indicating when it is safe to cross. However, the box that controls the intersection contains a massive amount of wiring. This is necessary to connect each actuator with each signal so at any given time, the control box knows each state. Wall's new system simplifies each box to only two wires, both required to power the signals.

The future is clear for Wall and his research team. They have established dates to deliver the engineering and expect field trials to commence in June. They are building prototypes with their commercial partner Campbell Company, who currently makes the accessible pedestrian signals that chirp and talk for the handicapped. "The signals we're building are more than prototypes. These devices can actually go into the field and work today," said Wall. "We're using existing infrastructure and communicating intelligence over it. It's cost effective, it simplifies the connection to two wires and it can be immediately installed in all the existing crosswalks in the country."

Richard Wall (left) and Dustin Devoe, MS-ECE, presented progress on the "Smart Signals" research during a poster presentation at the 88th Annual TRB meeting in Washington, DC. Funding for this work comes from the University Transportation Centers Program and is supplemented by a grant from Idaho's Higher Education Research Committee.

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