



OTREC

OREGON TRANSPORTATION RESEARCH
AND EDUCATION CONSORTIUM

OTREC NEWS

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OTREC is a National University Transportation Center, and is a partnership between Portland State University, the University of Oregon, Oregon State University and the Oregon Institute of Technology



OTREC Projects Underway

The fall term at Oregon universities is well underway, and OTREC research, education and technology transfer projects at our partner universities are in full swing. Twenty-two projects selected in the spring have made exciting progress, and we are looking forward to final reports. Thirty-six new projects announced in September are just getting started. Forty-five faculty and approximately eighty students (undergraduate and graduate) across our four campuses are involved in OTREC projects. There are exciting collaborations across departments and campuses, and even several projects with faculty partners in other parts of the country.

A variety of work that relates to our theme and supports national transportation initiatives is in progress at PSU, UO, OSU

and OIT. Research topics cross disciplines and involve many transportation topics including truck travel, freeway traffic and incidents, at-risk drivers, bridges, travel time, land use and planning, society and communities, bicycles, pedestrians and fish passage through culverts. Projects recently selected have added topics to the repertoire of issues being studied and include bus transit, weigh-in-motion devices, user fees, freight, travel forecasting, food delivery, asphalt pavements, travel demand, traffic

safety, ITS and access management. Education and technology transfer projects are providing a city design lecture series, experiential learning (a mix of academic and practical experience) and new transportation courses.

OTREC is supporting transportation student groups and a summer young scholars program with a focus on transportation. A unique new traffic lab in rural Oregon is under development, and we are looking forward to a distinctive project that will

document the history of Oregon's land use planning and transportation linkage. Several of these projects are featured in this newsletter, and our annual report (available in early December) will include more details on our progress.

A study to investigate travel time estimation errors (see page 4) is one of many OTREC sponsored projects.



Spotlight on ODOT: Key Research Partner

OTREC is privileged to have a strong partnership with the Oregon Department of Transportation (ODOT). The synergy between ODOT and OTREC faculty is resulting in more and better connections between research and practice. From OTREC's inception, ODOT has been generous in its support. In 2005, **Dr. Bernie Jones**, ODOT's Research Manager, agreed to

serve on OTREC's Executive Committee, and ODOT's research selection process has been synchronized with the OTREC peer-reviewed selection procedure. This has resulted in new relationships between ODOT staff and OTREC faculty. In fact, **45%** of our research projects include ODOT as a partner, which is critical for our matching fund requirements. Dr. Jones says that "ODOT research has benefited greatly through this collaboration with OTREC. By matching ODOT funds with OTREC funds, ODOT Research will be able to stretch its dollars further. This will enhance our ability to transfer research results toward improving our state's transportation system."

"Oregon's ability to address its transportation challenges is greatly enhanced by the Congressional investment in OTREC, enabling researchers to tackle and solve problems ranging from aging infrastructure to system operations and new funding methods."

Gail Achterman

Oregon Transportation Commission

OTREC is also pleased to welcome ODOT's Highway Division Deputy Director **Doug Tindall** and Transportation Modeling Program Manager **Bill Upton** to our Board of Advisors. OTREC looks forward to many years of successful collaboration with ODOT, and we thank them for their continued support!





Director's Corner

Welcome to the second edition of the OTREC Newsletter. Here in the Pacific Northwest we have returned to the academic year's rhythm with new students, faculty, courses, seminars and research projects. We're especially pleased to welcome new PSU faculty member Dr. Miguel Figliozi, a specialist in freight and logistics. Thanks to the hard work of many, we have accomplished a great deal in the 11 months since beginning operation. As you will read in this newsletter, we have awarded 58 research, education and technology transfer projects (based on 429 peer reviews), with 22 external partners. A total of 45 faculty and approximately 80 students are now working on OTREC projects. My special thanks to Hau Hagedorn, Research Program Manager, for overseeing this rigorous process. From the beginning, we have emphasized the importance of collaboration, and it is gratifying to report that 13 of our projects involve faculty on more than one campus, and

28 projects involve multiple principal investigators. These cross-institution and cross-discipline partnerships are made possible by our four-campus consortium, and will leave a lasting mark.

Students are always a focus for our activities, and students at PSU are preparing to host the 5th Annual **TransNow Student Conference**, with more than 45 students from the Northwest coming to Portland for a one-day students-only event (see the website at <http://its.pdx.edu/Transnow07>). Students are leading the arrangements for this conference, and have planned poster sessions, invited a keynote speaker, and arranged a panel discussion featuring regional transportation professionals. Students will also participate in the ITE Traffic Bowl held the evening before the conference.

This summer we were saddened by the death of PSU Special Assistant to the President for Strategic Planning, Public Policy & Government Relations Deborah Murdock, who was instrumental in OTREC's establishment. Debbie was passionate about students, public service, PSU, and even transportation research. We will miss her energy, enthusiasm, passion, optimism, support, and friendship deeply. In recognition of Debbie's passion for students and their success, the PSU Foundation has established a Debbie Murdock Scholarship; please contact me if you would like more information.

This newsletter provides just a snapshot of our activities, and I hope it conveys some of the excellent collaborative spirit that exists within the OTREC community. Please visit our website at www.otrec.us and feel free to contact me directly at bertini@pdx.edu if you have questions, comments, ideas or want to get involved.

Robert L. Bertini, OTREC Director

OTREC Theme:

Advanced Technologies, Integration of Land Use and Transportation, Healthy Communities

Faculty Profile—Lei Zhang

Dr. Lei Zhang joined the School of Civil and Construction Engineering at OSU in January 2006, after earning two master's degrees (Civil Engineering, Applied Economics) and a Ph.D. in Civil Engineering from the University of Minnesota. Dr. Zhang conducts advanced and applied research on the dynamics of transportation and urban systems, as well as implications on management and policy decisions. He leads the Interdisciplinary Transportation Analysis and Modeling (*iTram*) research group at OSU. *iTram* employs and promotes interdisciplinary approaches to modeling the interdependencies between transportation, land use and natural resources, analyzing the full impact of planning and engineering decisions to ensure efficient resource allocation and sustainable development in the broad domain of transportation.

Dr. Zhang's current and previous research projects study freeway operations, traveler information systems, road pricing and distance-based charges, land use-transportation co-evolution, network growth, public and private transportation financing, urban growth scenarios and multimodal investment criteria. He has worked closely with OTREC, ODOT, and other state and local agencies in research project development and delivery. Dr. Zhang currently teaches four courses at OSU: Transportation Engineering, Transportation Systems Analysis



Dr. Lei Zhang (center) and graduate students at OSU.

and Planning, Advanced Transportation Supply-Demand Modeling and Land Use/Transportation Management and Policy. A new co-taught course on Multimodal Transportation is also under development. In his spare time, Dr. Zhang enjoys movies, soccer, and photography. More information on Dr. Zhang's research and teaching can be found at: <http://web.engr.oregonstate.edu/~zhangle>. Contact Dr. Zhang at: lei.zhang@oregonstate.edu.

2007-2008 OTREC Projects

On September 7, 2007, the OTREC Executive Committee selected the top 36 research, education and technology transfer projects for 2007-2008 funding. Over 80 proposals were received in May, and each proposal went through a rigorous peer review process. Peer-reviewers ranked the proposals on the basis of intellectual merit, broad impacts, relevance to OTREC's theme and the national transportation research agenda. Projects with ODOT as a co-sponsor are noted with *.

RESEARCH

- *08-81 Socio-economic effect of vehicle mileage fees, phase 2; Pls: B. Starr McMullen, Lei Zhang, OSU
- *08-91 Evaluation of the Oregon DMV at-risk driver program, phase 2; PI: James Strathman, PSU
- 08-93 Analysis of TriMet bus operator absence patterns; PI: James Strathman, PSU
- 08-98 Active transportation, neighborhood planning and participatory GIS, phase 2: Pls: Marc Schlossberg, Nico Larco, UO
- 08-102 Operational analysis of transit bus collisions; PI: James Strathman, PSU
- 08-108 Empirical observation of the impact of traffic oscillations of freeway safety; Pls: Chris Monsere, PSU, Sue Ahn, ASU
- *08-115 Application of WIM data for improved modeling, design and rating; Pls: Chris Monsere, PSU, Christopher Higgins, OSU, Andrew Nichols, Marshall U.
- 08-116 Road user fee; PI: Anthony Rufolo, PSU
- 08-130 Value of reliability; Pls: Robert Bertini, PSU, David Levinson, Univ of MN
- 08-131 Oregon freight data mart; Pls: Miguel Figliozi, Robert Bertini, PSU
- 08-133 Freight distribution problems in congested urban areas: fast and effective solution procedures to time-dependent vehicle routing problems; PI: Miguel Figliozi, PSU
- 08-134 Practical approximations to quantify the impact of time windows and delivery sizes on freight VMT in urban areas; PI: Miguel Figliozi, PSU
- 08-137 Dynamic activity-based travel forecasting system; PI: John Gliebe, PSU
- *08-145 Assessment and refinement of real-time travel time algorithms for use in practice, phase 2; Pls: Kristin Tufte, PSU, Sue Ahn, ASU
- *08-147 Influence of environmental effects on durability of CFRP for shear strengthening of RC girders, phase 2; PI: Christopher Higgins, OSU
- *08-148 Seismic damage state models for Oregon bridges; PI: Peter Dusicka, PSU
- 08-152 Overlooked density: re-thinking transportation options in suburbia; PI: Nico Larco, UO
- 08-154 Food delivery footprint: addressing transportation, packaging and waste in the food supply chain; Pls: Madeleine Pullman, Darrell Brown, Scott Marshall, Wayne Wakeland, PSU
- *08-155 Instrumentation for mechanistic design implementation; PI: Todd Scholz, OSU
- *08-156 Development of an open source bridge management system; PI: Michael Scott, OSU
- 08-160 Long-term evaluation of individualized marketing programs for travel demand management; Pls: Jennifer Dill, Cynthia Mohr, PSU
- 08-161 Hurricane wave forces on highway bridge superstructure: repair and retrofit of existing bridges, phase 2; Pls: Daniel Cox, Solomon Yim, OSU
- 08-163 No more freeways: urban land use-transportation dynamics without freeway capacity expansion; PI: Lei Zhang, OSU
- *08-176 Expanding Development of the Oregon traffic safety data archive; PI: Chris Monsere, PSU
- 08-184 Healthy communities, transportation-land use connection and children's travel; Pls: Yizhao Yang, Marc Schlossberg, UO
- *08-190 Using archived ITS data to measure the operational benefits of a system-wide adaptive ramp metering system; Pls: Robert Bertini, PSU, Lei Zhang, OSU
- *08-192 Evaluating the effectiveness of the Safety Investment Program (SIP) policies for Oregon; Pls: Chris Monsere, PSU, Karen Dixon, OSU
- *08-195 Freight performance measures: approach analysis; Pls: Lei Zhang, OSU, Chris Monsere, PSU
- *08-196 Access management best practices manual; PI: Karen Dixon, OSU

EDUCATION

- 08-97 Closing the gap: developing a transportation curriculum for the Oregon Young Scholars Program; Pls: Carla Gary, Bethany Johnson, UO
- *08-126 IBPI: bicycle and pedestrian education program; Pls: Lynn Weigand, Jennifer Dill, PSU, Marc Schlossberg, UO, Karen Dixon, OSU
- 08-144 Traffic engineering training for rural communities; PI: Roger Lindgren, OIT
- 08-187 Distribution logistics course; PI: Miguel Figliozi, PSU

TECHNOLOGY TRANSFER

- 08-138 Oregon transportation planning experience; Pls: Carl Abbott, Sam Lowry, PSU
- 08-173 Options for integrating urban land use and travel demand models; PI: John Gliebe, PSU
- 08-175 Increasing capacity in rural communities: planning for alternative transportation; Pls: Megan Smith, Keavy Cook, Bethany Johnson, UO

Travel Time Estimation Improvement Study

Congestion on urban freeways is a serious issue for the U.S. and is a federal research priority. One approach to reducing congestion is to carefully measure travel time and provide travelers with information about current and forecasted travel conditions through such methods as dynamic message signs (DMS), internet services, through 511 or via in-vehicle devices.

Dr. Kristin Tufte, PSU, is leading a collaborative and cross-disciplinary project to identify and understand the sources of errors for real-time travel time estimation in Portland, Oregon. Dr. Tufte and students, working in partnership with the Oregon Department of Transportation (ODOT), analyzed data collected during 544 probe vehicle runs using GPS devices. Data was collected during morning and afternoon peak periods on various days of the week. The large ground truth data set (approximately 160 driving hours) and data analysis calculations (travel time estimations and vehicle trajectories) are stored in PORTAL, the official transportation data archive for the Portland metropolitan region.

The data were analyzed using several travel time estimation algorithms, and the analysis helped understand the reliability and performance of the algorithms under various conditions (free-flow, congestion, incidents). The analysis revealed that accuracy of estimates was good with mean absolute percent error of 11.3% over all runs. In addition, 85% of the runs exhibited errors less than the FHWA-suggested threshold of 20% (see Figure 1).

The evaluation showed that one primary cause of error in travel time estimation in the Portland metropolitan area is transition traffic conditions. Transition conditions such as a change from congested to uncongested and vice versa cannot be captured by using instantaneous point speeds extrapolated for travel time estimation. Historical data or trends should be incorporated into the travel time estimation to improve accuracy during transition conditions.

Another cause of estimation error was shown to be detector spacing. A speed plot for a ground truth run on I-5 southbound, south of downtown Portland, identifies a problematic section as one where there is large detector spacing, resulting in missed data from changing traffic volumes at a merge (see Figure 2). Additional analysis shows that adding a detector in this location would significantly reduce the error. Higher detector density is critical in locations where bottlenecks occur.

A third primary cause of error is failure of detectors. The research team experienced this first hand during the course of the study, as detectors experienced a variety of outages due to construction, vehicle impact, and even theft! The need for portable detectors or methods to incorporate historical data from the detector or use gap filling techniques to account for the loss in data became clear.

The project team will continue this project with additional funding from OTREC. Issues such as conditions under which travel time estimations are inaccurate and additional influence area adjustments will be investigated.

Dr. Tufte notes that the success of this project was due to the true collaborative nature of the PSU and ODOT team that combined research at PSU with ODOT in-field expertise and feedback.

Dr. Kristin Tufte, Ph.D. student Sirisha Kothuri, and students Enas Fayed and Josh Crain were members of the PSU team. ODOT staff Galen McGill, Dennis Mitchell and Jack Marchant, along with former ODOT staff Hau Hagedorn, provided expertise in Intelligent Transportation Systems, data processing and real-world operations. A paper, "Toward Understanding and Reducing Errors in Real-Time Estimation of Travel Times (Kothuri, Tufte, Fayed and Bertini) has been accepted for presentation at the 87th Annual Meeting of the Transportation Research Board. Contact: Dr. Kristin Tufte, tufte@pdx.edu.

"The project wouldn't have happened without the great interactive group of people we worked with."

Kristin Tufte
Principal Investigator

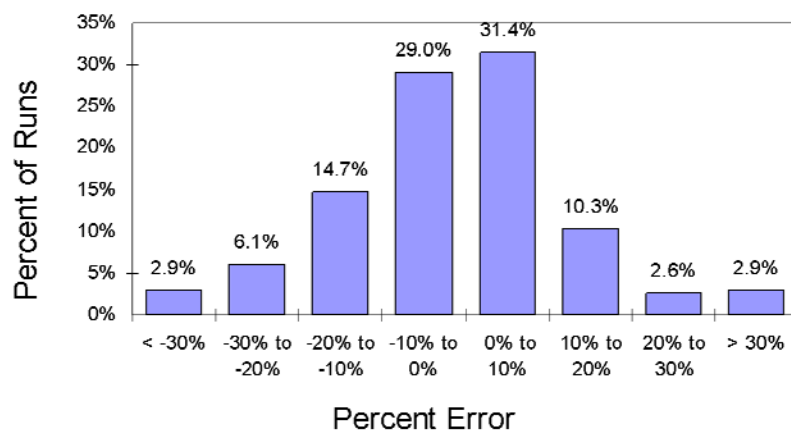


Figure 1. This figure shows that of the runs collected, 85% had absolute estimation error under the FHWA-suggested threshold of 20%.

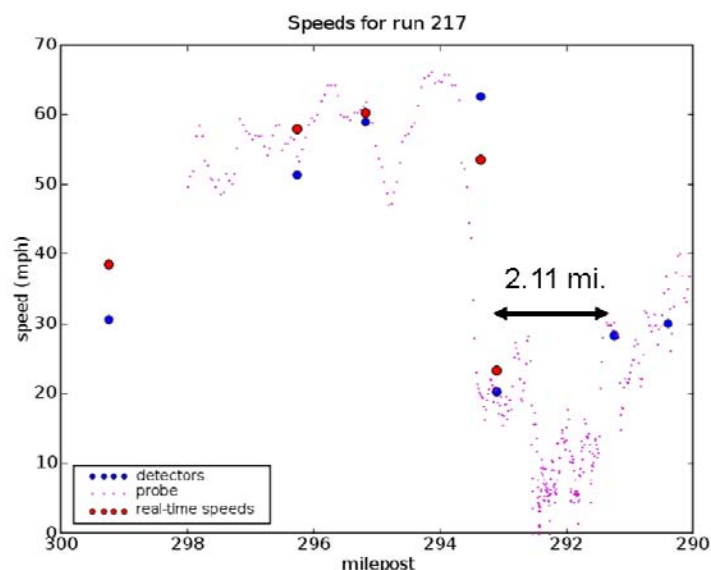


Figure 2. Graphical and statistical analysis show a speed plot for a ground truth run on Hwy I-5 southbound, south of downtown Portland.

Students and Professionals Team up for Multiway Boulevard Project

Multiway boulevards offer one possible alternative to congested arterials in metropolitan areas. These boulevards have several middle lanes of faster moving traffic separated by medians from side access and parking lanes (right). Since local traffic travels in the slower access lanes, these streets support a wider array of land uses than typical arterials. Ground level retail uses can take advantage of on-street parking in the access lanes, while residential uses like the park-like quality of the landscaped boulevards. These boulevards can reduce



congestion, improve pedestrian and automobile safety, and support more unified land uses. An applied research project by Dr. Mark Gillem at UO brings together a diverse community to investigate the transportation and land use potential of replacing a typical urban arterial with multiway boulevards.

Tyler Nishitani and Jesse Golden

Prof. Gillem's project uses a case study approach that focuses on the Franklin Corridor in the Eugene-Springfield, OR area. Public workshops held earlier this year drew over 300 people from Springfield and Eugene, and over 30 undergraduate and graduate students have been involved in planning studios and research, including investigations on how other communities have addressed arterials that accommodate local and through traffic, pedestrians and bicycles. Students in architecture, landscape architecture and planning, along with local professionals and members of the general public, worked together to analyze existing conditions, develop planning objectives, prepare conceptual diagrams for development of the corridor, examine alternative right-of-way sections and calculate potential future development capacities in terms of densities and open space. The study corridor is under intense development pressure, and this project looks beyond individual development proposals to study the potential benefits for the corridor as a whole.

This exciting collaboration between university, community and cities helps bridge the gap between academia and practice. A primary sponsor of the project is the American Institute of Architects, and OTREC funding has helped support student studio work last spring and this fall. This project addresses USDOT strategic objectives of improved safety, enhanced mobility and investigation of minimizing environmental impacts of transportation. Contact: Dr. Mark Gillem, mark@uoregon.edu.

OIT Traffic Engineering Lab Development

The OIT Traffic Engineering Laboratory in Cornett Hall formally started up in September 2007. This combination research and education space now occupies officially designated space. Previously, traffic simulation and other traffic engineering activities were accomplished in a mixed-use civil engineering student computer lab. The new lab consists of five new computer workstations equipped with state-of-the-practice traffic simulation and evaluation software. A "hardware in the loop" traffic simulator was purchased and will be commissioned in late 2007. Dr. Roger Lindgren received a grant from OTREC that will allow for the remainder of the computers/software/peripherals to be purchased for this rural community campus. Currently the primary users of the Traffic Lab are students enrolled in a senior elective traffic engineering course. The first research project to use the new facilities is the OIT-PSU Collaborative Project, "Evaluation of OR140 Ice Warning System" under an ITS Partnership agreement with ODOT. Contact: Dr. Roger Lindgren: roger.lindgren@oit.edu.



Right: Dr. Roger Lindgren (standing) and student Jared Lowther perform computer based traffic simulations using a "hardware in the loop" setup.

Concrete Bridge Girders Strengthened with CFRP

Dr. Christopher Higgins and his students in the Kiewit Center for Infrastructure and Transportation at OSU are very interested in the safety of existing bridges across the nation, as is the USDOT. Many reinforced concrete bridges in the national inventory are lightly reinforced for shear and are exhibiting diagonal cracking and distress. There is interest in trying to extend the service lives of these bridges by rehabilitating them. One of the most promising materials for strengthening these bridges is surface bonded carbon fiber-reinforced polymers (CFRP). Recent OSU research on fatigue response of full-size reinforced concrete deck girders (RCDG) repaired with CFRP indicates that the CFRP did not exhibit strength degradation under high-cycle fatigue. However, long-term environmental deterioration of the bonded CFRP remains uncertain.

Through an OTREC project co-sponsored by ODOT, Dr. Higgins and his research team are assessing the impact to shear of environmental exposure conditions on reinforced concrete bridge girders strengthened with CFRP, quantifying possible long-term durability issues. Also, they are investigating the behavior of reinforced concrete bridge girders strengthened with CFRP and exposed to combined accelerated environmental aging and fatigue to evaluate durability of CFRP repairs for shear. This research involves testing full-size girders strengthened with surface bonded CFRP in the new large-size environmental-structural loading chamber located in the Structural Engineering Research Laboratory at OSU. After environmental exposure, the specimens will be tested to destruction. Results will be compared with test specimens not subjected to environmental exposure and findings will be used to recommend design, analysis, and inspection methods.



Above: CFRP strengthened beam control specimen; approximately 500,000 pounds of applied force was used to fail the specimen.

Environmental testing system designs and construction are complete; specimens are designed and four are constructed. Two specimens have been pre-cracked and repaired with CFRP and are currently undergoing long-term immersion in a water bath. Additional specimens are now being pre-cracked and repaired in preparation of freeze-thaw exposure. Two master's and four undergraduate students are working on the project. Materials are being provided by BASF-MBrace, and Fyfe Company, LLC. Contact: Dr. Christopher Higgins, chris.higgins@orst.edu.

Modeling Data Gaps in Loop Detector Systems

Traffic-monitoring systems, such as those using loop detectors, are prone to failures for various reasons and for various time intervals, causing data "gaps." These coverage gaps adversely affect the accuracy of traveler information products, such as the TripCheck Speed Map for the Portland Metropolitan Region (see Figure 1) and travel time estimation. An applied research project led by Dr. David Maier in the Computer Science Department at PSU is exploring the use of models to fill gaps in live data feeds, with the additional challenge of doing so in near real time. Using historical data, Dr. Maier's research team seeks to improve the completeness of traffic monitoring data to provide better coverage and accuracy for travel information services.

The objective of this project is to fill in missing data in real-time. A key feature is that data imputation is being studied in the context of its effect on end-user applications as different applications have significantly different requirements with regard to data accuracy. Relationships between detectors are modeled under conditions when all detectors are operational and linear and non-linear regression is used to "learn" the relationships between the detectors. Once the relationships are understood, if a detector fails, the modeled relationships and available live data can be used to impute the missing data.

To evaluate these techniques, data was gathered from PORTAL, the transportation data archive for the Portland metropolitan region. Selected highway segments were chosen for study based on highway geometry and traffic conditions. Off-line models were built for the segments under study and the accuracy of various imputation methods was examined using synthetic gaps of various lengths.

As shown in Figure 2 on the next page, the research so far indicates that non-linear regression is an effective technique for imputing data. Under conditions that exhibit relatively long gaps, non-linear regression over historical data appears to be superior to less complex imputation techniques such as roll-forward.

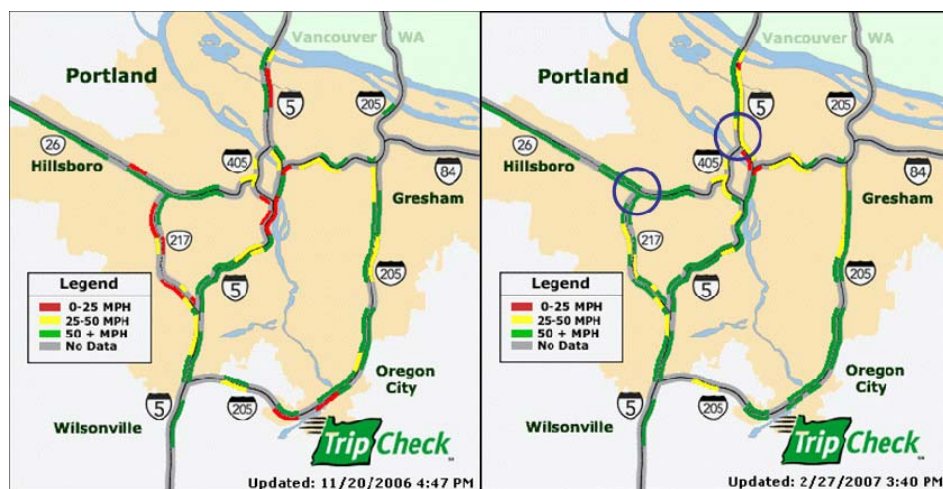


Figure 1. Screenshots of speed maps of the Portland Metropolitan Area Freeway System presented by TripCheck. Notice the difference in availability in the circled areas.

Continued on next page

Active Transportation and Low Income Children

Since the mid 1980s, the prevalence of obesity among children in the United States has increased dramatically. Currently 18% of children 6-19 years old are considered obese, compared with 6% in the late 1970s. Researchers are examining the degree to which community-level factors influence children's physical activity, particularly the level of active transportation to and from school. Past research has found that "walkability" factors such as the intersection density, street connectivity and presence of tree cover near schools are positive predictors of children walking to school. Other literature focuses on the influence of neighborhood safety on levels of physical activity.

Dr. Jessica Greene at UO is examining research questions related to this topic. Her OTREC research project uses survey data from an ethnically diverse group of low income children to ask 1) What is the relationship between children's active transportation and overall physical activity and obesity? 2) How do race and gender influence active transportation, overall physical activity and obesity? 3) What are the contributions of walkability measures and perceived neighborhood safety (traffic and crime-related) on active transportation?

Data from a cross sectional survey of 765 parents and guardians of children in Florida aged 5-18 who receive Medicaid were used to develop multivariate regression models to identify the independent influences of walkability and safety on active transportation. The models test whether walkability factors are equally important in communities that are perceived to be safe and those that are unsafe. They also examine the relationship between active transportation and overall physical activity and obesity for this low income population of children.

Preliminary data analysis has begun. Dr. Greene has found that there are racial and gender differences in active transportation and physical activity in the low income population studied. In this study, African American children were more likely to walk or bike to school than Caucasian children (37% vs. 21%), and Caucasian girls were less likely than Caucasian boys or African American children to walk frequently or engage in strenuous physical exercise, yet they have the lowest obesity rates. It was found that perceived neighborhood danger lowers the rate of some forms of physical activity for children. In areas of higher perceived danger, children are less likely to walk and participate in strenuous activity, but danger does not appear to influence active transportation to school.

Graduate student Lori Quillen has been working on this research and presented some early findings at the URISA GIS in Public Health Conference last spring in New Orleans. The Center for Health Care Strategies in Hamilton, NJ is a partner in this project. Contact: Dr. Jessica Greene, jessicag@uoregon.edu.



Data Gaps continued

Future work will explore incorporating additional inputs for prediction, such as time-delayed measurements, in addition to exploring more choices of nonlinear regression. In addition, gap patterns in the historical PORTAL data will be studied and the performance of the gap-filling algorithms will be studied on those patterns. Through this study, it is conjectured that providing an estimated system state may be better than displaying incomplete or erroneous data.

Unique to this research is the emphasis on application-driven data imputation and the effective use of real-time or near-real-time traffic monitoring data to provide the best possible estimations for different end-user applications. This research supports national surface-transportation research priorities, including the Systems Management Information area (ITS Joint Program Office) within USDOT.

Research team members include Dr. David Maier, Dr. Kristin Tufte, Dr. Robert Bertini and computer science Ph.D. student Rafael J. Fernandez-Moctezuma. The team presented a paper at the 2007 IEEE Conference on Intelligent Transportation Systems. Contact: Dr. David Maier, maier@cs.pdx.edu.

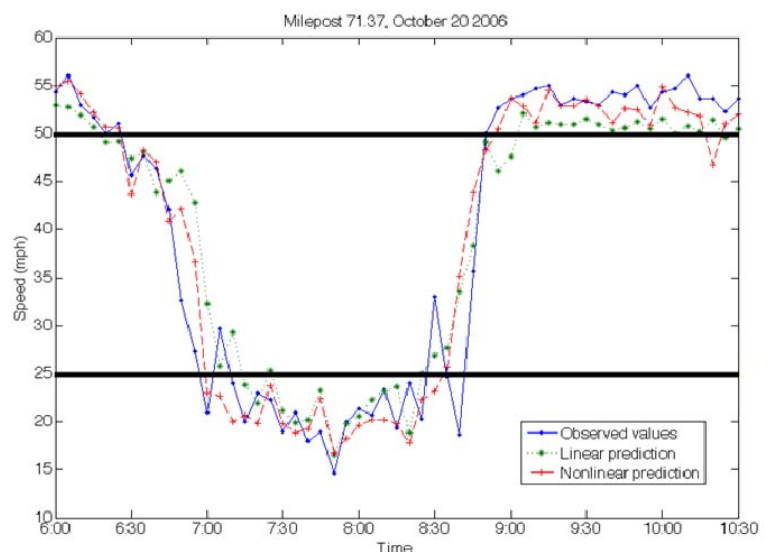



Figure 2. Experimental results. The predicted values of both models follow closely the observed values. The horizontal cutoffs correspond to the ODOT speed cutoffs used for speed maps. The predicted outputs are classified accordingly as they would be displayed in a speed map, with measured accuracy rates of 80% for the linear model and 89% for the nonlinear model.



CTS Transportation Seminar Series at PSU

The Center for Transportation Studies at Portland State University offers weekly transportation seminars on Fridays at noon. The seminar is broadcast live on the web, and is open to the public. Viewers may submit questions by email before or during the seminar. More than 145 seminars are archived in streaming video on the CTS website. The Spring and Fall 2007 seminars featured 20 guest speakers from a variety of universities, public agencies and organizations. In addition to students registered for credit, more than 330 professionals and guests also attended the seminars during the spring term. OTREC sponsored three speakers as part of our Visiting Scholar Program (below).

 **RSS Podcasts Debut:** Audio files (mp3) of the CTS Seminar Seminars are now available. The upcoming seminar schedule, as well as podcasts and archived streaming videos of past seminars is available on the web: <http://www.cts.pdx.edu/seminars.htm>.

OTREC Visiting Scholar Program

"Car-Free" John Pucher

Self-described "car-free" Professor John Pucher from the Bloustein School of Planning and Public Policy at Rutgers University was the first fall OTREC Visiting Scholar and CTS Seminar guest on September 28, 2007. His presentation, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from Europe," was standing room only, and the audience enjoyed his energetic presentation and photos of bike-friendly features in cities across Europe. Dr. Pucher examined a range of public health impacts of our urban transport systems and argued that the current car dependence of American cities is responsible for enormous environmental harm, social isolation, lack of physical activity, and traffic dangers. He described how improving the convenience, safety, and attractiveness of walking and cycling is crucial to overcoming these negative impacts. Many cities in Europe have been successful at greatly improving conditions for walking and cycling, while integrating them fully with high-quality public transit systems. Dr. Pucher discussed specific policies and programs and advocated their widespread adoption in American cities. A lively discussion with faculty, students and members of the Portland Bicycle Master Plan Committee followed the seminar.



Susan Handy on Bicycling in Davis, CA

In early May OTREC hosted a visit by Dr. Susan Handy from the Sustainable Transportation Center at the University of California Davis. Dr. Handy's research focuses on the connections between land use and transportation, and she is well known for her work on the impact of neighborhood design on travel behavior. Dr. Handy was the guest lecturer at the CTS Transportation Seminar Series, and presented "Bicycling in Davis, CA: A Critical Look at Policy and Behavior in the First Platinum Bicycle City in the U.S." Although Davis has long been held up as a model bicycling community where residents bike as a normal part of their daily lives, it has not been rigorously studied. Dr. Handy presented highlights from several studies underway at UC Davis that are helping to fill this gap, including an analysis of the history of bicycling policy, a behavioral study of factors contributing to high levels of

bicycling in Davis, and an evaluation of a recent campaign to get kids to bicycle to soccer games. The seminar was followed by a luncheon discussion with faculty, students and members of the Portland Platinum Advisory Committee.

Peter Stopher, University of Sydney

Dr. Peter Stopher, Professor of Transport Planning at the University of Sydney, was the OTREC Visiting Scholar at the CTS Seminar on May 18, 2007. In his presentation, "Using a GPS Panel to Evaluate Travel Behavior Changes," Dr. Stopher outlined several projects that are using personal GPS devices to collect travel behavior data of individuals. He described survey procedures, and provided an overview of some of the results emerging from collection of data. Of particular interest is that the GPS surveys are being conducted in most cases by using a panel, with at least two waves of data collection, and that panel members carry the GPS devices for anywhere from one week to one month. Initial studies of the variability in daily travel, where there are no fatigue effects from recording multiple days in a diary, are showing some interesting patterns and leading to some important conclusions. Dr. Stopher has more than 40 years of experience as an educator and consultant in transport planning and has published many papers and books in transport-related topics. He teaches and researches in transport policy and planning, survey methods, travel demand modeling, and environmental analysis, and is pioneering the use of GPS devices in transport surveys. Dr. Stopher had lunch with faculty, students and members of the Oregon Modeling Steering Committee.



New Student Group at UO

The Transportation and Livability Student Group at UO is a student organization that brings together undergraduate and graduate students in Planning Public Policy & Management (PPPM), Architecture, Landscape

Architecture, Geography, Environmental Studies and other majors. Students focus on planning and design of transportation systems as they relate to community quality of life and livability. Group members are passionate in their mission to enhance the education of the group as well as communicate transportation and community livability issues across campus.

The fall term at UO finds students in the group involved in many activities in a variety of disciplines. Environmental studies student Aaron Michalson is working to locate a building to construct a biodiesel processor that could use university cafeteria cooking oils to sustainably power campus facilities vehicles. PPPM student Christo Brehm developed a mobile GIS tool to measure "complete streets" in cities around the country. The new tool can be used to advocate for street designs that accommodate all users (pedestrians, bicyclists, transit users, automobiles). A group of students in architecture and landscape architecture is working to redesign bike parking facilities at a neighborhood elementary school as part of the Design Bridge service learning program under Dr. Nico Larco. A team of planning students is exploring land use implications of alternative future bus routes in the West Eugene area, and is in dialogue with the neighborhood council, citizen's advocacy group and Lane Transit District. PPPM graduate students Tim Brass and Titus Tomlison are working on a research model to explore universal design (access for persons with disabilities) around transit, pedestrian, and bicycle facilities. In addition, two new group members from economics and business are working to promote the group on campus, secure funding and define the group's organizational structure. The Transportation and Livability Student Group offers a speaker series featuring transportation professionals and sends students to local and regional transportation conferences and workshops. OTREC is pleased to sponsor this active multi-disciplinary transportation group.



Transportation & Livability

a multi-disciplinary student group at the University of Oregon

Walter H. Kramer Fellowship Established



Transportation research and education has had a long, rich history at PSU. In 1966, Dr. Walter H. Kramer founded the first transportation studies center in the Department of Marketing (now School of Business Administration). Focusing on transportation research and education, Dr. Kramer believed that "the actions of an individual, of a college, can determine the future of our cities, our society," and devoted himself toward bringing "the resources of the faculty to bear on the problems of the community."

Since Dr. Kramer's retirement in 1987, transportation research and education has grown in the PSU School of Business Administration (the Supply and Logistics program), the College of Urban and Public Affairs (the Center for Transportation Studies), the Maseeh College of Engineering and Computer Science (the Intelligent Transportation Systems Laboratory) as well as across campus and

statewide (OTREC). Students in many graduate degree programs are engaged in multi-disciplinary, multi-modal research projects that are helping to "determine the future of our cities, our society" and assisting in developing new solutions to "the problems of the community."

Beginning with a donation by Dr. Kramer's daughter and husband, Mary Jo and Chris Chapman, a Walter H. Kramer Endowed Transportation Fellowship has been established. The fellowship is aimed at providing financial support to PSU graduate students enrolled in transportation-related graduate programs and working on multi-disciplinary, multi-modal research connected with making a difference in "our cities, our society," and "the community." If you would like to contribute to the Walter H. Kramer Endowed Transportation Fellowship, please contact OTREC at 503-725-4249 or otrec@pdx.edu.

Anderson Joins OTREC



Rie Anderson is the newest OTREC employee, hired in May as the Fiscal Operations Coordinator. Rie manages the fiscal aspects of OTREC activities by tracking grant and match expenditures, reviewing sub-award budgets, and communicating with department grant administrators and other universities on fiscal requirements. Rie is a Certified Public Accountant with eight years of experience

in fiscal-related work in public and private sectors. She earned a B.A. in International Relations from Kobe City University of Foreign Studies and a Post-baccalaureate Certificate in Accounting from Portland State University. She is a lifetime member of Beta Gamma Sigma Business Honor Society.

RAC National Meeting

Hau Hagedorn, OTREC Research Project Manager, participated in AASHTO's Research Advisory Committee (RAC) meeting in Seattle, WA in August. RAC identifies research needs, defines research emphasis areas, utilizes research findings, maintains an overview of state related research activities and funding, and works to employ the National Cooperative Highway Research Program (NCHRP) effectively. Discussions were focused on the status of national transportation research programs and what is needed to prepare for the future of transportation and transportation research. Specific sessions covered research partnerships between departments of transportation and universities, research project management, and documenting the value of research. OTREC appreciates the opportunity to strengthen the ties between UTCs and AASHTO.

Upcoming Workshop: Building Future Transportation Leadership

OTREC, TriMet and David Evans and Associates are teaming up to host a unique workshop in January 2008. Transportation planners and professionals from local public agencies and firms will be invited to a special workshop designed to explore how rail transit and land use planning thrive in Portland.

Transportation experts from the Portland area will lead the workshop, and will share their stories and lessons learned from Portland's success. The goal is to pass on knowledge to a new generation of transportation leaders. The workshop will be offered to a wider audience in the near future.

OTREC Light Rail Transit Series: Facilities Design

OTREC will offer Facilities Design, part of our Light Rail Transit workshop series in the spring of 2008. The course will provide an overview, practical applications and guidance with respect to modern U.S. light rail facilities design practice.

Course instructors from TriMet and David Evans and Associates are actively involved in current light rail design, construction and operation. More information will be available soon on the OTREC education web page:

<http://otrec.us/education.php>

OSU Traffic Safety Workshops

The Kiewit Center, in partnership with ODOT, offers a series of traffic safety workshops on the OSU campus in Corvallis. Upcoming workshops include:

[Traffic Engineering Fundamentals](#)

December 10-12, 2007

[Uniform Traffic Control Devices](#)

March 18-20, 2008

[Road Safety Audit](#)

April 10-11, 2008

[Safety Improvement Identification, Analysis and Evaluation](#)

April 21-23, 2008

[Access Management Techniques](#)

May 12-13, 2008

[Lighting and Illumination](#)

June 17-19, 2008

For more information, please visit:

<http://kiewit.oregonstate.edu/workshops.html>

Northwest Transportation Conference at OSU

The 2008 Northwest Transportation Conference, "Making the Most of What We Have; Innovations for the 21st Century" will be held at OSU on February 5-7, 2008. The theme addresses innovations that maintain and improve transportation system service levels with constrained funding and limited resources. Sessions will be held on transportation growth management, capacity of existing infrastructure, smart infrastructure investments and long life and recycled materials. Nationally recognized keynote speakers are on the schedule.

More information: <http://kiewit.oregonstate.edu/nwtc>

IBPI Workshop—February 2008

The Initiative for Bicycle and Pedestrian Innovation (IBPI) at PSU will offer a workshop entitled "Designing Pedestrian Facilities for Accessibility" in February 2008. This course, developed by the Federal Highway Administration (FHWA) and the Association of Pedestrian and Bicycle Professionals (APBP), teaches how to apply the guidelines and policies of the Americans with Disabilities Act (ADA) to public rights-of-way. The course will examine a range of pedestrian disabilities, how people with disabilities use pedestrian facilities, and how designs affect mobility and safety. For more information, visit: <http://www.ibpi.usp.pdx.edu>

Dixon Presentations Recognized

Presentations by OSU Associate Professor Karen Dixon and co-authors were ranked first and second at the Urban Street Symposium held in June in Seattle, WA. These top presentations were based on papers entitled *Benefits and Risks of Urban Roadside Landscape: Finding a Livable Balanced Response* and *Effect of Urban Street Design on Operating Speed*. Dixon, et. al, have been invited to present these papers at the "Best of the 3rd Urban Street Symposium" session at the upcoming TRB Annual Meeting in 2008.

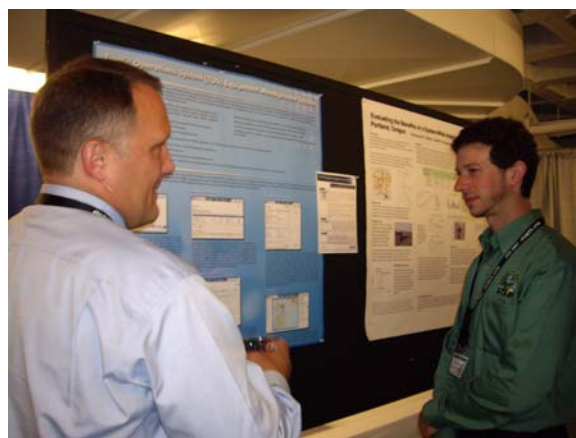
ITE District 6 Annual Meeting Participation



Students and faculty from OTREC were very active at the Institute of Transportation Engineers (ITE) District 6 Annual Meeting in Portland, OR in July. Dr. Chris Monsere worked diligently as a member of the Local Arrangements Committee (LAC), and more than 10 PSU students

participated in presentations and poster sessions. OTREC faculty and staff moderated sessions and presented posters, including Robert Bertini, Chris Monsere, Jennifer Dill, Karen Dixon and Hau Hagedorn. Josh Crain, PSU student, was on the winning team for the James Kell Student Competition; Dr. Chris Monsere won the Best Chapter/Section Website Award for the Oregon Section website, and Drs. Bertini and Tufte won paper awards. Special thanks to Peter Koonce, LAC Chair, of Kittelson & Associates, Inc.,

for making the conference so accessible to students.



Above: PSU students with faculty members Chris Monsere and Kristin Tufte at the ITED6 Meeting.

Left: student Oren Eshel (right) presents research poster.

OTREC Names Board of Advisors

OTREC's structure includes an external Board of Advisors (BOA) consisting of representatives from transportation-related organizations, primarily in Oregon. The role of the BOA is to help develop OTREC's foundation and provide guidance on OTREC's overall mission. We are pleased to announce the formation of the first Board, with the following outstanding transportation community members:

- **Scott Bricker**, Executive Director, Bicycle Transportation Alliance
- **Andy Cotugno**, Director of Planning, Metro
- **Phillip Ditzler**, Administrator, Oregon Division, Federal Highway Administration
- **Tomas Endicott**, Founder, Policy and Business Development, SeQuential Biofuels
- **Mike Flanigon**, Director, Office of Technology, Federal Transit Administration
- **Lavinia Gordon**, Director, City of Portland Office of Transportation, Bureau of Transportation System Management
- **Ruth Harshfield**, Executive Director, Oregon Alliance for Community Traffic Safety
- **Rob Innerfeld**, Transportation Planning Manager, City of Eugene
- **John Isbell**, Director of Corporate Delivery Logistics, Nike, Inc.
- **Susie Lahsene**, Corporate Planning Manager, Port of Portland
- **Jay Lyman**, Project Manager, Columbia River Crossing Project, David Evans & Associates
- **Randy McCourt**, Principal, DKS Associates
- **Neil McFarlane**, Executive Director of Capital Projects, TriMet
- **Dr. Nancy Nihan**, Director, Transportation Northwest (TransNow)
- **Hon. Lynn Peterson**, Clackamas County Commissioner
- **Tom Schwetz**, Director of Development Services, Lane Transit District
- **Doug Tindall**, Deputy Director, Highway Division, Oregon Department of Transportation
- **Bill Upton**, Oregon Modeling Steering Committee, Transp Modeling Program Manager, Oregon Department of Transportation

CUTC Meeting in Madison, WI



This past June, Prof. Robert Bertini, Hau Hagedorn and Jenny Kincaid spent a few days in Madison, WI to participate in the Council of University Transportation Centers (CUTC) annual meeting, hosted by the Midwest Regional UTC at the University of Wisconsin. Sessions were held on strategic planning, communication best practices, and RITA news/guidelines. In addition, OTREC staff appreciated the opportunity to meet with other administrative managers from centers around the country and to enjoy the lovely UW terrace on Lake Mendota.

From Left: Robin Kline and Amy Stearns (RITA), Robert Bertini, Jenny Kincaid and Hau Hagedorn at the CUTC meeting.

Region X Participation

The Region X Consortium meets bi-annually and includes representatives from UTCs and state transportation departments in Oregon, Washington, Idaho and Alaska. Participants discuss regional collaboration for transportation research and education efforts. OTREC staff and partner university faculty attended the spring meeting in Moscow, ID, and the fall meeting in Seattle, WA. The agendas included development of a regional pooled-fund research project, whereby the Consortium will sponsor major research projects from a regional needs perspective. Education initiatives were also topics, including possible creation of a pilot distance education course that could be offered and coordinated between the Region X universities. The next meeting will be held at the University of Alaska in May 2008.

Region X Joint Reception Planned for TRB 2008

OTREC, AUTC (Alaska), TransNow (Washington) and NIATT (Idaho) will host a joint reception at the 87th Annual Meeting of the Transportation Research Board in January. We look forward to seeing our colleagues from around the region and across the nation at this event. The date and location will be announced on our web site and through e-mail in early January.

Advisory Board Profile: Neil McFarlane



OTREC is honored to welcome Neil McFarlane, TriMet's Executive Director for Capital Projects and Facilities Division, to our Board of Advisors. Mr. McFarlane is currently serving as the vice chair of PSU's Maseeh College of Engineering and Computer Science Advisory Board, and has worked diligently to support and develop the Urban Rail Transit short course series. Mr. McFarlane leads the development, design and construction of TriMet's capital facilities. Under Neil's direction, TriMet completed the Interstate MAX light rail extension to North Portland, which opened in May 2004. The project set new standards for environmentally friendly construction and disadvantaged business enterprise (DBE) participation. Neil also represented TriMet in the unique public-private partnership with Bechtel Enterprises, which developed and constructed the Airport MAX extension. This 5.5 mile project is the first train-to-plane transit service on the West Coast. Previously, Neil was Project Control Director for the 18 mile, \$963 million Westside light rail project, which featured a 3 mile twin bore tunnel, 20 stations, 3,800 park and ride spaces and the nation's first low floor light rail vehicles. Neil also helped manage construction for the

500,000 square foot \$90 million Oregon Convention Center. Neil earned an MA in Urban Planning from the University of California at Los Angeles in 1977 and a BS from California State Polytechnic University at Pomona in 1975. We appreciate the valuable multimodal perspectives and commitment to research and education that Neil brings to our external advisory board.

OTREC is a National University Transportation Center sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration

Web site: www.otrec.us ▪ E-mail: otrec@pdx.edu

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