



# PACTRANS

UNIVERSITY TRANSPORTATION CENTER NEWSLETTER

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## UW Hosted the 2013 National Student Steel Bridge Competition at the University of Washington

The University of Washington Department of Civil and Environmental Engineering (UW CEE) hosted the 2013 National Student Steel Bridge Competition (NSSBC) on May 31 – June 1, 2013 at the University of Washington. The competition was jointly organized by the American Institute of Steel Construction (AISC), the American Society of Civil Engineers (ASCE) and UW CEE. Student teams from approximately 45 universities from across the U.S., Canada and Mexico that qualified for the national competition by placing at the top of their regional competition descended on Seattle for the NSSBC. PacTrans provided financial support for this important student event.



Pictured clockwise from top left: 2013 National Student Steel Bridge Competition (NSSBC) winners University of California Berkeley, University of Washington students Stetson Shearer and Amy Riley accepting the Sportsmanship Award at the 2013 NSSBC Banquet, Washington State University Steel Bridge team constructing their bridge in competition, and student steel bridge teams participating in Tug-o-war competition and other recreational activities.

Get in Touch with PacTrans:

University of Washington More Hall Room 112

Website: <http://www.pactrans.org>

email: [PacTrans@uw.edu](mailto:PacTrans@uw.edu)

Phone: (206) 685-0395

Find us On Twitter!  @PacTransUTC

# About Pacific NW Transportation Consortium



The Pacific Northwest Transportation Consortium (PacTrans) is the new Region 10 University Transportation Center (UTC) established in January 2012 with a \$3.5 million grant from the US Department of Transportation.

The Pacific Northwest Transportation Consortium (PacTrans) is the new Region 10 University Transportation Center (UTC) established in January 2012 with a \$3.5 million grant from the US Department of Transportation (USDOT). PacTrans is a coalition of transportation professionals and educators from Oregon State University (OSU), the University of Alaska, Fairbanks (UAF), University of Idaho (UI), University of Washington (UW), and Washington State University (WSU). With dual themes of safety and sustainability, PacTrans serves as an engine and showcase for transportation research, education, and workforce development in the Pacific Northwest.

The goal of PacTrans is to create an environment where consortium universities and transportation agencies within Region 10 work together synergistically. The solutions that we develop will meet the needs of the Region

and provide direction for the five strategic goals of the US Department of Transportation:

- Safety
- State of good repair
- Livable communities
- Environmental sustainability
- Economic competitiveness

The Pacific Northwest offers a unique blend of opportunities to examine a variety of transportation issues, including those related to urban centers, rural communities, diverse geographic features (e.g., coastal plains, mountain ranges), and a growing population of pedestrians and bicyclists. This diversity makes the Pacific Northwest a natural laboratory in which to investigate transportation solutions that are applicable both locally and nationally. PacTrans is dedicated to collaborating with transportation agencies, companies, and research institutions to jointly develop safe and sustainable solutions for the diverse transportation needs of the Pacific Northwest.

The UW serves as the lead institution. The PacTrans Center is located at More 112 on the UW campus. Dr. Yinhai Wang, Professor of transportation engineering in the Civil and Environmental Engineering Department, serves as Director of PacTrans.

## Upcoming Events

Save the date for these upcoming PacTrans sponsored events! More information will be on the way as plans are finalized.

### PacTrans External Advisory Board Meeting

Where: University of Washington Campus in Seattle

When: Thursday, Oct. 17th

### Region 10 Transportation Conference

Where: University of Washington Campus in Seattle

When: Friday, Oct. 18th

### Region 10 Student Transportation Conference

Where: University of Washington Campus in Seattle

When: Saturday, Oct. 19th

## Research

### Region 10 UTC served as an Angel Investor for Greenroads Project

On May 8, 2013, the White House and U.S. Department of Transportation hosted a Champions of Change event called "Transportation Technology Solutions for the 21st Century," in which the University of Washington's Greenroads Project was honored. Recognized for its unique rating system designed to certify sustainable roadway and transportation projects, Greenroads started as a small, unfunded research project at the University of Washington in 2007 and has since grown through the Region 10 UTC and other sponsorship to become a fully functional rating system owned and operated by its own nonprofit company, the Greenroads Foundation. It has been, and continues to be, used by roadway projects throughout the United States and globally

to deliver sustainable transportation infrastructure. Studies show that a road built to Greenroads standards can result in reduced costs (both initial and long-term), reduced environmental impact, increased livability, and innovation in sustainable practices and markets.

Early support from the RITA/UTC Program allowed Greenroads to make substantial progress in this field of research and begin implementation on a commercial level about five years ahead of the more traditional way large-scale transportation research is funded.

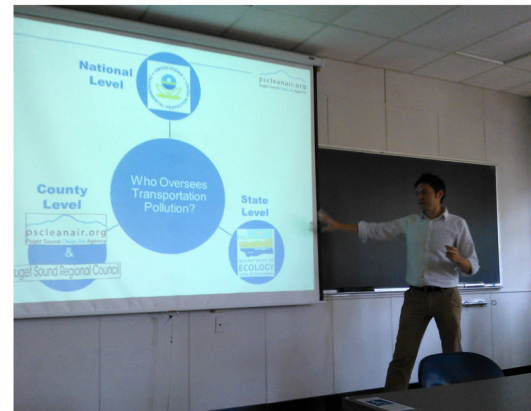
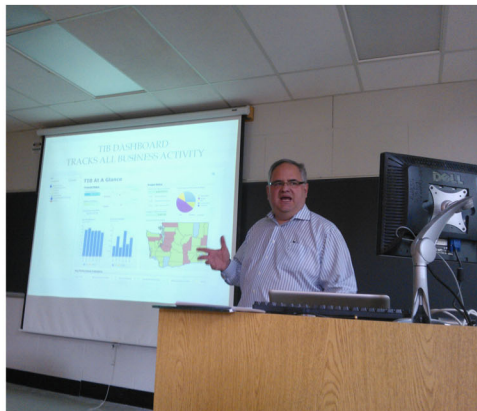
For more information about Greenroads, please contact Steve Muench email: [stmuench@uw.edu](mailto:stmuench@uw.edu) phone: (206) 616-1259



From left, UW Associate Professor Steve Muench, Greenroads Executive Director Jeralee Anderson, Craig Weiland and Freeman Anthony. On May 8th, Jeralee Anderson accepted the award along with Champions from across all modes of our transportation industry who are providing significant leadership in the development and/or deployment of transportation technology solutions for the 21st Century at the local, state or regional level.

## Recent PacTrans Guest Speakers

In recent months, PacTrans has invited a number of recognized transportation professionals to visit PacTrans and talk to University of Washington graduate students. Lectures were hosted in collaboration with the CEE 500 Transportation Seminar at the UW Department of Civil and Environmental Engineering, and were attended primarily by University of Washington students, faculty, and staff. PacTrans would like to thank all speakers who took the time to present during the Spring quarter!



Recognized transportation professionals deliver guest lectures to the University of Washington CEE 500 class. Guest speakers included Peter Koonce (top left), Michael Williams (top right), Bruce Haldors (bottom left), Steven Gorcester (bottom center), and Eric Saganic (bottom right)

## Spring 2013 CEE 500 Transportation Seminar Guest Speakers

**April 5th**

**Bruce Haldors, CEO of Transpo Group**

*What Transportation Can Be: Innovative and Comprehensive Transportation Solutions*

**April 12th**

**Shuming Yan, WSDOT Urban Planning Office**

*Exploring Toll Financing at WSDOT SR 167 Extension Comprehensive Tolling Study*

**May 3rd**

**Peter Koonce, City of Portland Bureau of Transportation**

*Confessions of a Traffic Engineer: The Misuse of Level of Service and its Impact on Active Transportation*

**May 10th**

**Erik Saganic, Puget Sound Clean Air Agency**

*Puget Sound Transportation Pollution Policy and Research*

**May 17th**

**Joe Story, DKS Transportation Solutions**

*Forecasting Variability in Travel Demand: Context, Research and Applications for the Future*

**May 24th**

**Professor Heng Wei, University of Cincinnati**

*Integrated Transportation Conformity Analysis*

**May 31st**

**Michael Williams, Sound Transit**

*Sound Transit Projects and Plans for a Potential ST3 Public Vote*

**June 7th**

**Stevan Gorcester, Transportation Improvement Board**

*LEAN Business Processes at the Washington State Transportation Improvement Board*

## Outreach

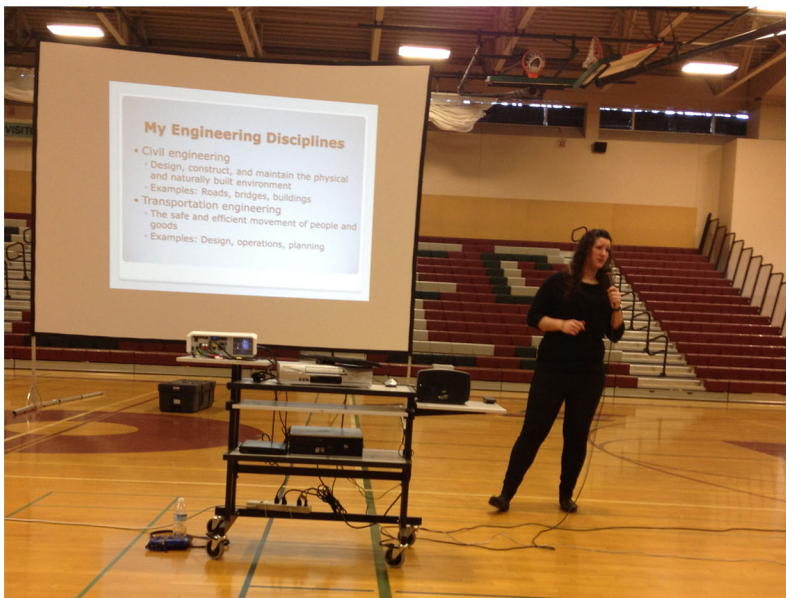
### Engineering Discovery Days at the University of Washington

The University of Washington College of Engineering held its annual Engineering Discovery Days on April 26th and 27th. Engineering Discovery Days draws thousands of students from the region's elementary, middle, and high schools. These visitors come to explore the exhibits and demonstrations that showcase the work and research done by the UW engineering students. This year PacTrans co-sponsored several events with the Smart Transportation Applications & Research (STAR) Lab and the Human Factors & Statistical Modeling (HFSM) Lab. These events included "How Traffic Signals Work," "Traffic Simulation Software," and "Driven to Distraction."

Image: UW grad Student Jonathan Corey explains traffic signals to area school children



### Research Team Conducts Outreach at Local High Schools



Graduate student Erika Miller from the University of Washington presents at Eastlake High School

Teenage drivers are one of the most vulnerable driving populations; they exhibit greater crash risks when compared to drivers in other age groups. This group is also more likely to engage in distractive activities while driving. In response to this epidemic, all five universities within PacTrans, led by David Hurwitz of Oregon State University, have collaborated over the past school year to develop and implement an outreach program to educate teen drivers in the Pacific Northwest regarding the dangers of distracted driving. The research team is now in the administering phase of the project and each institution is visiting high schools within their respective areas to deliver this interactive demonstration. The study aims at examining what tasks teens consider to be distracting as compared to their level of engagement in these same distracting tasks. The team also anticipates that this application of feedback will moderate the risk taking behaviors of these reached populations. The data collected from this research project will structure future collaborative efforts amongst the universities in educating teenage drivers about the implications of driver distractions.

**Current Research**

**PacTrans supports Oregon State University Graduate Students Presenting at the 7th International Driving Assessment Conference**

PacTrans was well represented by members of Dr. Hurwitz’s research group at the 7th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design on June 17-20, 2013 held in Bolton Landing, New York. PacTrans student of the year Joshua Swake (OSU MS 13’) and his co-author Mafruhatul “Medha” Jannat (PhD candidate) presented their paper, “Driver Response to Phase Termination at Signalized Intersections” in a podium session (far left, below). Additionally, Patrick Marnell (OSU MS 13’) presented his paper, “Permissive Left-Turn Behavior at the Flashing Yellow Arrow in the Presence of Pedestrians” in a hybrid session (center, below). The contingent from Oregon State University attended the dinner cruise on Lake George where they had the opportunity to network with over 200 colleagues from around the world (right, below).



Joshua Swake presenting in a podium session at the DA Conference



Patrick Marnell presenting in a hybrid session at the DA Conference



Members of Dr. Hurwitz’s research group  
Left to right: Joshua Swake, Patrick Marnell, David Hurwitz, & Mafruhatul Jannat

**Undergraduate Honors Students Conduct Research on Distracted Walking and Driving at PacTrans Member Institution Oregon State University**

Two Undergraduate Honors College (UHC) students, Patrick Burns and Makenzie Ellett, are conducting UHC Thesis Projects that consider the influence of distractions on transportation user behavior. They are completing the work under the mentorship of Dr. Hurwitz in the OSU Driving and Bicycling Simulator Laboratory. Patrick is studying the glance patterns of bicyclists as they perform left turns at intersections with different levels of traffic control (upper right). Makenzie is studying the influence of texting and driving on driver glance patterns and lateral position of the vehicle (lower right).



Cyclist outfitted with eye tracking equipment (left) Patrick Burns (Right)



Makenzie’s mom demonstrating texting while driving (left); Makenzie Ellett (right)

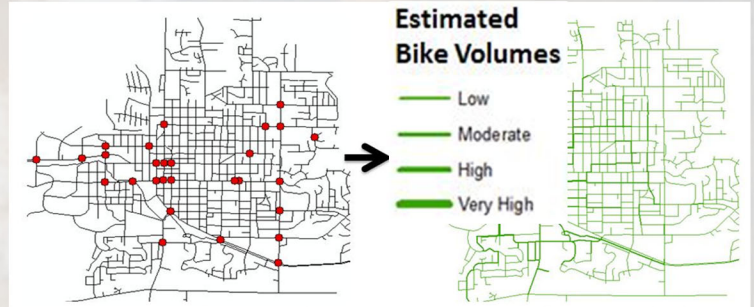
## Current Research

### PacTrans Project Spotlight on Safe and Livable Communities

A UTC project led by Dr. Mike Dixon at the University of Idaho lives up to its multifaceted nature with a number of new developments on several fronts. Randal Brunello built the foundation for his Masters thesis by completing a performance measurement test bed tool that facilitates exploring different applications of traffic controller data. This tool was recently demonstrated using a new method that leverages this data to estimate turning movement counts at intersections.

UI student Stephen McDaniel created a new tool to spatially interpolate bicycle count data, with promising results for a case study community. In practice, limited resources restrict count data collection to a few sites, as illustrated by the red dots on the map shown on the left. Planners have difficulty translating these data points into bike volumes on routes between count locations or throughout the network. Stephen's tool uses a city's street network, land use data, and any count data to estimate bike volumes on other portions of the network, for which no count data exist. Using this tool, practitioners can better anticipate bike network usage and network improvement impacts.

David Porter and David Kim worked closely with ODOT to meet their need for inexpensive travel time data collection using Bluetooth technology. They expanded their system's capabilities and developed an economical system that anonymously



Visualization of bicycle volume estimation tool

monously monitors traveler movements, focusing on passenger vehicles. The new data collection system is the first of its kind to use Bluetooth data to track vehicles as they approach and leave a data collection point. This system will be a cost-effective means to anonymously measure urban street system performance, offering a variety of performance measures, in addition to travel time, such as delay.

Even if the primary travel mode is not walking, ultimately we begin and end all of our trips as pedestrians. UW student Kristian Henrickson hopes to ease data collection with the technology found in Microsoft's Kinect<sup>®</sup>, (see story below) which shows potential, even in difficult crowd conditions.

For more information about this research, contact Dr. Michael Dixon email: [mdixon@uidaho.edu](mailto:mdixon@uidaho.edu) phone: 208-885-4338

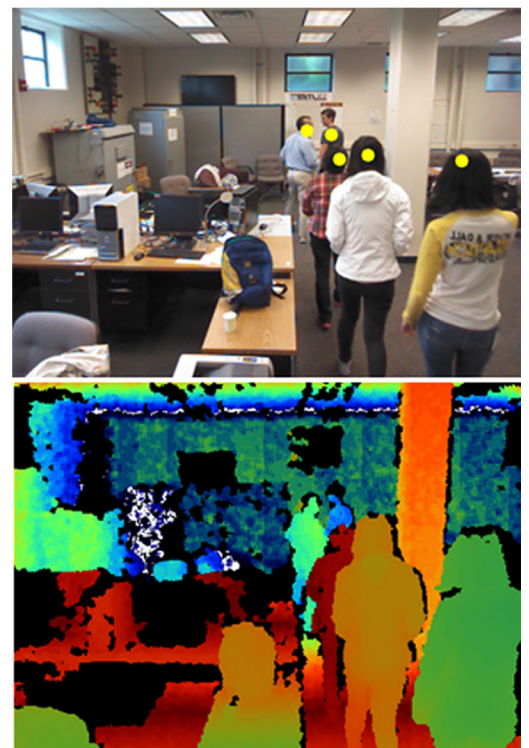
### PacTrans Funded Research: Pedestrian Detection Using Microsoft's Kinect<sup>®</sup>

Pedestrian movement data including volumes, walking speeds, and trajectories are essential in transportation engineering, planning, and research. While traditional image-based pedestrian detectors provide very rich information, their performance degrades quickly with increased occurrence of occlusion, when one person is partially obscured by another. The 3D sensing capabilities of Microsoft's Kinect present a potential cost-effective solution for occlusion-robust pedestrian detection.

The Kinect Device was developed as a natural human interaction interface for the Xbox 360<sup>®</sup> game system. With its multi sensor array, it provides both color video and depth information in real time, allowing occluded pedestrians to be separated and counted individually. This represents a significant improvement over conventional video-only approaches. Initial testing indicates that the approach used in this study is accurate and robust, and may be suitable for pedestrian and bicycle data collection in crowded scenes. The results of this project have been submitted for presentation at the forthcoming Transportation Research Board Annual Meeting.

**Top right: Occluded pedestrians in a crowded and cluttered room are detected using the combined depth and color image from the Kinect**

**Bottom right: Color image representing the depth information returned by Microsoft's Kinect<sup>®</sup> device.**



For more information about this research, contact Dr. Yin Hai Wang email: [yinhai@uw.edu](mailto:yinhai@uw.edu) phone: (206) 616-2696

## PacTrans Distinguished Lecture Series

### PacTrans Distinguished Lecture Series – Dr. Robert Cervero

The University of Washington hosted Dr. Robert Cervero on April 19th for his lecture on sustainable mobility, place-making and economic competitiveness. This lecture was attended by University of Washington students, faculty, and alumni, as well as by local practitioners. The key concepts presented in the lecture were the economic impacts of different urban mobility strategies and development patterns and the impact of place-making. Dr. Cervero showed how better organization and utilization of transit resulted in workforce productivity gains and how place-making could encourage reductions in vehicle trips. Case studies from Hong Kong, China and Fruitvale, CA were highlighted as examples of place-making; where these locations were rebuilt with pedestrian and bicycle friendly layouts to encourage walking, cycling and transit trips over single occupancy vehicles.



Robert Cervero lectures at the University of Washington

## Outreach

### Transportation Improvement Board: Success in Performance Management

The Washington State Transportation Improvement Board (TIB) selects and manages state grant investments in local street and sidewalk projects serving 320 cities and urban counties statewide. The majority of program funding comes from three cents of the state gas tax, totaling about \$100 million per year. The TIB funds major urban arterial projects based on benefits to safety, economic development, mobility and physical condition. Small cities receive both construction and preservation funding from the TIB. Currently, TIB customers are building more than 350 projects. New grants of \$110 million come out in November 2013.

TIB programs are driven by performance feedback and Lean process improvements. A decade ago, TIB began using a performance management dashboard to track its business processes and projects and to establish an accurate overview of the agency's performance. The TIB Dashboard informs daily business activities and long-term performance targets. For example, the TIB tracks pavement condition in 165 small cities and targets funding to meet established Dashboard goals. That effort turned the curve on small city street condition and stopped a long-term slide toward pavement failure.

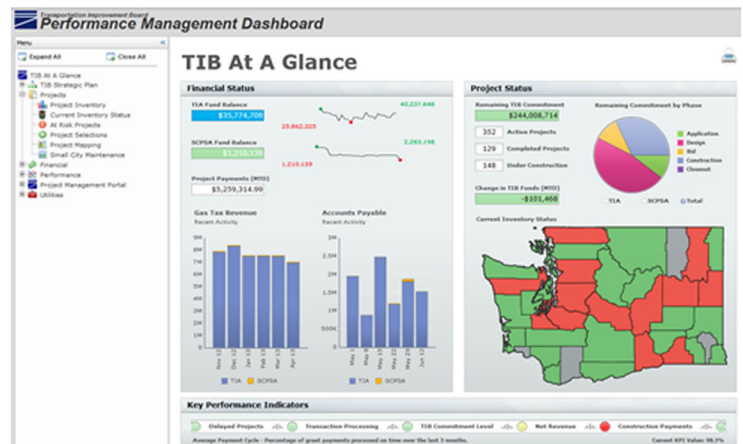
Since adopting a Lean performance management culture, the TIB has right-sized its project inventory and corrected years of prior over-programming. Accomplishments include:

- Reducing the number of active grant projects down to roughly 400, from 970 in 2001;
- Condensing the amount of time needed to pay customers from up to five months to an average of 17 days;
- Decreasing the number of delayed projects by 70%, saving millions in public funds due to construction inflation costs; and
- Curtailing losses due to unused design work by 90%.



**Top right: Steve Gorcester, Director of the Transportation Improvement Board. Bottom right: TIB Dashboard online interface**

To view the TIB Dashboard visit <http://www.tib.wa.gov/TIBDashboard/>.





## News and Events

### PacTrans-Sponsored Bicycle Urbanism Symposium a Great Success

PacTrans Sponsored the 2013 International Bicycle Urbanism Symposium, held at the University Of Washington College Of Built Environments, which took place June 19-22, 2013. This event was attended by practitioners, academics, policy makers, and advocates with a broad range of backgrounds for presentations, workshops, and discussion on topics related to urban bicycling. This year, attendees enjoyed 45 panel, paper, and workshop sessions on topics such as Rider education, Health and Safety, and Bicycling data analysis. In addition, bicycling tours were held to allow out of town visitors to experience Seattle's bicycle infrastructure first hand.

**Right: Participants gather for the 2013 Bicycle Urbanism Symposium at the University of Washington's Gould Hall**



### Motor Trend's Epic Drives visits the OSU Driving & Bicycling Simulator



**Researchers from the OSU Driving & Bicycling Simulator pose with a 300K Mercedes Race Car In order Left to Right: Mafruhatul Jannat, Justin Neill, David Hurwitz, and Arthur St. Antoine**

On June 24, 2013 Motor Trends YouTube Channel show Epic Drives stopped by the OSU Driving & Bicycling Simulator for a test drive. Host Arthur St. Antoine arrived on the OSU campus in the new \$296,000, 622-horsepower AMG SLS Black Series Mercedes Benz. Art took the driving simulator through its paces and spoke with Dr. David Hurwitz, an Assistant Professor in the School of Civil and Construction Engineering at OSU, whose research on teenage distracted driving has been supported by PacTrans. Dr. Hurwitz was joined by graduate research students Mafruhatul Jannat (3rd year PhD candidate) and Justin Neil (2nd year MS student). Both Justin and Medha had the chance to sit in the driver's seat of the Black Series Mercedes.

### WSDOT Response Minimizes Traffic Delay After Skagit River Bridge Collapse

On May 23, 2013, an oversized load struck the Skagit River Bridge on I-5 near Mt. Vernon, causing a portion of the bridge to collapse into the river. Following the collapse, PacTrans researchers at UW began to assemble resources and engage local officials to identify a proper response. PacTrans initiated a call for quick response research ideas immediately after the bridge collas, and will continue to discuss ideas for further action with WSDOT.

Although more than 71,000 drivers use this section of I-5 every day, temporary bridge spans and nearby detour routes helped to minimize traffic disruption. UW researchers continue to monitor traffic data with the hope that the lessons learned in this event will lead to improvements in future responses to such infrastructure failures. A permanent replacement bridge is expeted to be in place by October 1st (source: WSDOT).

**Right: Crews begin to move debris out of the Skagit River following the collapse of a bridge section. Image source: Seattle Times**



## News and Events

### PacTrans Associate Director at WSU Named New Dean of Engineering at Colorado State University

David I. McLean, Ph.D., P.E., has been involved in civil engineering education and research for more than 25 years at Washington State University. Until recently, he served as the chair of the Department of Civil and Environmental Engineering, which consists of 30 faculty, 7 staff, and approximately 600 undergraduate and 140 graduate students. Dr. McLean also served as the WSU director of the Transportation Research Center (TRAC), a tri-partner agreement between WSU, the University of Washington, and the Washington State Department of Transportation which was established to coordinate and leverage resources to support research addressing a broad range of transportation issues. Dr. McLean's research interests include the seismic response and retrofitting of bridges and the use of composite materials in structures. He has involved more than 75 graduate students and nearly 100 undergraduate students in his research, many of whom are now working for structural consulting firms and public agencies across the US and at research laboratories and academic institutions. External funding for his research activities exceeds \$12M. He is the author of more than 100 refereed papers, technical reports, monographs and book chapters. He has received numerous regional and national awards for his research, teaching, advising and consulting activities.

Dr. McLean has been a member of the PacTrans Board of Directors since its inception in January of 2012. As of July 1, 2013, Dr. McLean began his new role as the Dean of Colorado State University's College of Engineering. Congratulations and best of Luck to Dr. McLean as he pursues this exciting opportunity!



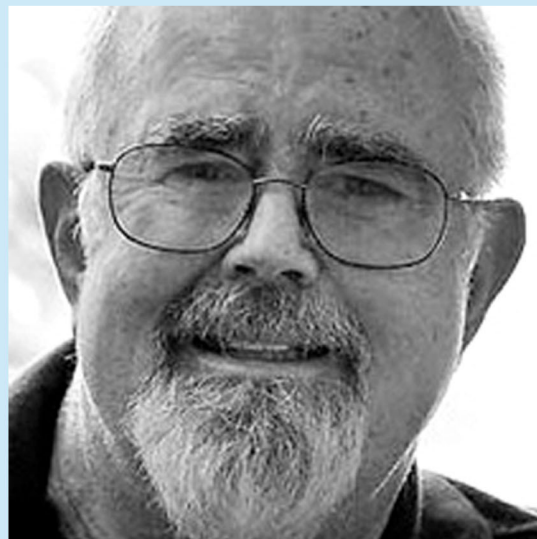
Dean of the College of Engineering at Colorado, State University, David McLean, Ph.D.

### PacTrans External Advisory Board Member Retires

Barnie Jones is a social scientist with over 27 years experience in transportation research in Oregon. His entire transportation career has been with the Oregon DOT, where he worked first as a senior research analyst, researching effectiveness of licensing and other regulatory programs for drivers, along with a broader range of transportation topics. In 1998, Barnie became manager of the Oregon Department of Transportation's Research Section. Dr. Jones has published numerous journal articles, book chapters and agency reports in the areas of highway safety, human factors in transportation, road pricing and statistical methods.

Dr. Jones has been a member of the PacTrans external advisory board since its inception in January of 2012. In June of 2013, Dr. Jones retired from his roles at the Oregon DOT and PacTrans. Many thanks to Dr. Jones for his years of service and support.

**Right: Former Research Section Manager at the Oregon Department of Transportation and PacTrans External Advisory board Member Barnie Jones Ph.D.**



# Meet the PacTrans Board of Directors



**Yinhai Wang, Ph.D.**  
*Director*  
*University of Washington*



**Linda Boyle, Ph.D.**  
*Associate Director of Research*  
*University of Washington*



**Anne Vernez-Moudon, Ph.D.**  
*Associate Dir. of Education*  
*University of Washington*



**Mark Hallenbeck, M.S.**  
*Associate Director of Outreach,*  
*University of Washington*



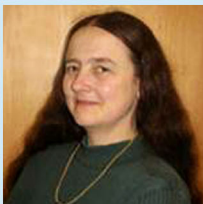
**Chris A. Bell, Ph.D.**  
*Associate Director at Oregon*  
*State University*



**Billy Connor**  
*Associate Director at the*  
*University of Alaska, Fairbanks*



**Kenneth L. Casavant, Ph.D.**  
*Associate Director at*  
*Washington State University*



**Karen R. Den Braven, Ph.D.**  
*Associate Director at the University*  
*of Idaho*

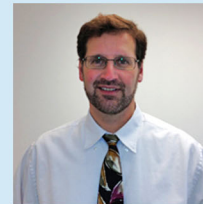
# Meet the PacTrans External Advisory Board



**Jerry Whitehead**  
*Chairman of the*  
*Idaho Transportation*  
*Department*



**Ned Parrish**  
*Research Program*  
*Manager for the*  
*Idaho Transportation*  
*Department*



**Clint Adler, P.E.**  
*Alaska Dept. of*  
*Transportation &*  
*Public Facilities*



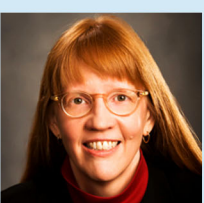
**Edward Mantey**  
*Vice President of*  
*Toyota Vehicle*  
*Planning, Corporate*  
*Strategy, Technical*  
*Administration*



**Wayne Kittelson**  
*Kittelson &*  
*Associates*



**Charlie Howard**  
*Dir. of Integrated*  
*Planning for Puget*  
*Sound Regional*  
*Council (PSRC)*



**Leni Oman**  
*Director of Research*  
*and Library Services,*  
*Washington State*  
*Department of*  
*Transportation*



**Michael Bufalino**  
*Research Manager,*  
*Oregon Department*  
*of Transportation*



**Scott Drumm**  
*Mgr., Research &*  
*Strategic Analysis*  
*Dept. at the Port of*  
*Portland, Portland,*  
*Oregon*