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## University Transportation Center Newsletter

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Save The Date: PacTrans Events

### Peer Exchange Visit Brings Tennessee DOT to the PacTrans STAR Lab

On July 23, officials from the Tennessee Department of Transportation (TDOT) visited the Smart Transportation Applications and Research (STAR) Lab to learn about its research and technologies regarding transportation data collection, management, and analytics tools. As part of a larger exchange event between Washington State Department of Transportation (WSDOT) and TDOT, Dr. Yin Hai Wang, STAR Lab director, introduced the TDOT visitors to the lab's facilities and recent research focuses, including data quality control, mobile device based data collection and knowledge discovery, and DRIVE Net.

A test drive through DRIVE Net (Digital Roadway Interactive Visualization and Evaluation Network) revealed a robust

capability to access and analyze datasets from WSDOT, including traffic detector data, incident data, INRIX data, and weather data. The network has the potential to answer important transportation questions, including how many congestion spots exist in a certain area, when they occur, and the ability to determine congestion patterns from the data.

The TDOT traveled to a number of Washington agencies, programs, facilities and partners in the exchange visit, and the stop at STAR Lab raised a great deal of interest in the lab's work. "Very impressive," said one TDOT representative. "I'm very happy to see your operations."



## WSDOT and PacTrans Join for Partnership Building Event

PacTrans welcomed officials from the Washington State Department of Transportation (WSDOT) to the University of Washington on August 6, 2014 to build and strengthen the organizations' partnership. Dr. Yinhai Wang, PacTrans director, presented the opportunities, strategic goals, and challenges facing the University Transportation Center.

With the theme of data-driven safety, many opportunities exist for universities, transportation agencies, and private industry to work together. Dr. Wang explained that such possibilities include establishing a collaboration platform and reforming transportation curriculum to address modern transportation requirements and challenges.

WSDOT also confirmed their participation in the PacTrans Region 10 Transportation Conference and will provide an update on their research priorities for funding at the event.



The WSDOT research office visited PacTrans on August 6 to discuss specific procedures and how the two agencies can collaborate.

## PacTrans Sponsors AutomotiveUI 2014 in Seattle, WA



Lunchtime panel, "Defining the Future of Automated Driving Experiences: A Chat with Experts." L to R: Dalila Szostak (Google), Jim Foley (Toyota), Wendy Ju (Stanford), Sabine Langlois (IRT System X/Renault), Sam La Magna (Intel), Lee Skrypchuk (Jaguar Land Rover).

The 6th International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutomotiveUI 14) was held in Seattle from September 17–September 19, 2014. As the premier forum for User Interface (UI) research in the automotive domain, the conference brought together 220 researchers and practitioners interested in both the technical and the human aspects of in-vehicle user interfaces

and applications. In total, there were 18 countries from Australia, Europe, Asia, and North America represented at the conference, with fairly equal representation from academia and industry. The conference was organized by Linda Ng Boyle, UW professor and associate director of research for PacTrans, and included workshops, lecture sessions and interactive demonstrations.

Workshops were held at the University of Washington Mary Gates Hall with topics ranging from in-vehicle human-machine interactions (HMI), wearable technologies and gesture interactions in the car, to electric vehicles. During the lunchtime hour, attendees were able to view the UW Formula SAE car. The lecture and poster sessions were held at the Motif Hotel in downtown Seattle and the program can be found at <http://www.autoui.org/14/program.php>. The conference proceedings will be available on the Association for Computing Machinery (ACM) Digital Library sometime later this year. Eight outstanding student volunteers from the UW Human Factors and Statistical Modeling Lab were on hand to help with the needs of the conference participants and PacTrans was one of several sponsors supporting the conference.



## Tsinghua University Delegation Visits PacTrans for Possible Collaborations on Smart Transportation Research and Education



A delegation led by Professor Zhang Yi, vice provost in global affairs, from Tsinghua University was welcomed by PacTrans and members of the University of Washington community on September 11th, 2014. The exchange brought faculty and administrators from both universities together to discuss cutting edge research in intelligent transportation and smart cities.

Professor Zhang of the Tsinghua delegation expressed enthusiasm for long-term cooperation between the

institutions. He hosted the UW delegation in 2008 and visited the UW in 2010. "I'm excited to see that seed grow," responded Dr. Yin Hai Wang, PacTrans director.

Dr. Wang led the presentation, introducing PacTrans' research, the work of Smart Transportation Applications and Research (STAR) Lab, and important questions for research. Though there are many questions, Dr. Wang explained, the most important thing is to effectively use the data and

derive effective solutions from data-driven research investigations.

It may be the "age of big data," but certain data challenges persist, such as the quality of existing data, the sensitivity of sensors, and missing types of data. PacTrans researchers work toward solutions for these issues, including e-Science transportation framework, the Digital Roadway Interactive Visualization and Evaluation Network (DRIVE Net), and new sensor technologies for pedestrian detection and safety.

A robust discussion time following the presentation revealed a strong interest in big data, as many connected with the challenges surrounding its definition and data quality, as well as the opportunities of big data in civil and environmental engineering.

## PacTrans Board of Director Member and Team Chosen for new USDA contract

Dr. Ken Casavant from Washington State University, current member of the PacTrans Board of Directors, Director of the Freight Policy Transportation Institute (FPTI) at WSU, and PI on several PacTrans research projects, recently received a request and funding to work with the USDA's Agricultural Marketing Service on a congressionally mandated study of "rural transportation issues."

This grant follows a baseline study, also congressionally mandated, completed by Casavant's Transportation

Group (TRG) four years earlier for USDA-AMS. Washington State University was the only University chosen to participate in that national research and policy effort. Those findings, focused on policy and programs, were very well received, with members of the TRG team receiving the prestigious Superior Service Award from USDA in 2011. This new two year effort will be led jointly by Dr. Casavant and the Assistant Director of FPTI, Dr. Jeremy Sage.



Jeremy Sage and Ken Casavant.

Lab were on hand to help with the needs of the conference participants and PacTrans was one of several sponsors supporting the conference.

## Board of Directors Convene at University of Washington



*With processes streamlined and responsibilities of principal investigators identified, the BOD looks forward to a successful fall.*

The PacTrans Board of Directors (BOD) met at the University of Washington on September 3<sup>rd</sup>, 2014 to discuss center activities, research, and technology transfer. During the full-day meeting, the BOD covered a range of matters, recounting the successes of the year thus far and establishing goals and strategies for upcoming endeavors.

The BOD reviewed the PacTrans Region 10 Conference taking place on Friday, October 17<sup>th</sup> and its student conference on the following day, and anticipates another productive and popular event. Research topics and projects were also considered under the new safety center.

## PacTrans Welcomes New Students at Orientation

This fall, PacTrans welcomed a new class of undergraduate and graduate students at orientations across its consortium universities. New students had the opportunity to learn about their program, meet faculty, and discover the activities of organizations like PacTrans. As part of its mission, PacTrans provides educational and workforce development activities, as

well as funding opportunities for students seeking transportation-related degrees. Undergraduates and graduates were invited to attend the PacTrans Region X Student Conference on October 18, 2014, a time for students to share their research and network.



Maria Bayya and Kristian Henrickson speak with undergraduates about PacTrans.



Don MacKenzie presents at the graduate orientation at the University of Washington.



# EDUCATION

## PacTrans Student Presents at the 2014 NATMEC Conference

Kristian Henrickson, University of Washington PhD student, attended the North American Travel Monitoring Exposition and Conference (NATMEC) 2014 in Chicago, June 29 – July 2. Kristian gave two lectern presentations, “Opportunistic GPS Location and MAC Address Sensing for Pedestrian Data Collection” and “Kinect-Based Pedestrian Detection for Crowded Scenes.”

In the first presentation, Kristian explained how the team (Dr. Yinhai Wang and Mr. Kristian Henrickson) used phones as mobile sensors to collect location data and Bluetooth mac addresses of pedestrians on the UW campus. They then used this data to estimate pedestrian speed and travel patterns, including origin and destination of travel.

In his other presentation, Kristian discussed a pedestrian detector the STAR Lab research team (Dr. Xiaofeng Chen, Mr. Kristian Henrickson, and Dr. Yinhai Wang) developed using the Microsoft Kinect game controller. The Kinect can record both color video imagery and 3D “depth map” of a scene. The detector uses image processing techniques to detect and count pedestrians using imagery recorded with the Kinect.

Kristian also had the opportunity to tour the HERE data center, and meet with professionals, public officials, and researchers at the conference.

## WORKFORCE DEVELOPMENT

### PacTrans Sponsors University of Idaho’s NIATT Student Teams:

#### A Workforce Development Tool

After the University of Idaho (UI) Vandal Formula Hybrid Racing Team won a number of the 2014 National Formula Hybrid Competition’s top awards, team members were asked to leave resumes with GM representatives and were invited by the Chrysler team for a site visit and job interviews, said the team’s faculty adviser Dan Cordon. Over the past five years, the team has had seven students go on to work in the automobile industry. The University of Idaho’s Clean Snowmobile Team has also seen three members go on to work in the automotive industry and ten work in the powersports industry in the last five years.

One of the reasons that the UI’s National Institute for Advanced Transportation Technology (NIATT) team initiatives are such impressive and effective workforce development and career building tools is that these aren’t simply a few weeks spent working on a project for a professor. A spot on the Formula Hybrid Racing Team or the Clean Snowmobile Team means working with students and professors from multiple disciplines for a year or more. This sustained involvement means students become familiar not only with the technology they are working with, but also with the tenor of the industry.

NIATT student Andrew Hooper, MS in Mechanical Engineering ’13, was with UI’s Clean Snowmobile Team for five years. During an interview following his team’s win in 2013, Hooper, now a project engineer for Polaris, stated



that working on the team is a “very big career-opportunity maker for a student.”

Working with a NIATT-sponsored team not only provides students with in-depth involvement with the transportation and automotive industry, it also encourages them to persist in that industry. Because of team members’ early and often industry-level instruction in the practical aspects of their field, students feel confident to take on professional projects and enter the job market in their field.

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# RESEARCH HIGHLIGHTS

## Improving Arterial Operations for All Users –

### Urban Street Performance Measurement for the Auto, Bicycle, and Pedestrian

Analyzing transportation system performance to optimize users' travel experiences occupies a major part of transportation professionals' time and effort. Historically, performance measurement has been largely an off-line, labor intensive endeavor. This is gradually changing to leverage widespread communication systems and technological resources for sensing, data processing, and systems management. PacTrans researchers from University of Idaho, University of Washington, and Oregon State University collaborated to develop methods and technologies to gather data from multiple sources in order to enable a more complete understanding of arterial traffic safety and systems efficiency.

This PacTrans multi-institutional research effort documents development on five fronts for multi-modal transportation system performance

measurement. Researchers developed a performance measurement development tool that leverages the advent of high resolution controller data. The research targets the use of high resolution controller data output from simulation to shorten the performance measurement development cycle.

Researchers developed and tested a GIS tool to process sparse bicycle counts and estimate network wide link bicycle counts, enabling transportation agencies to predict bike usage throughout the network.

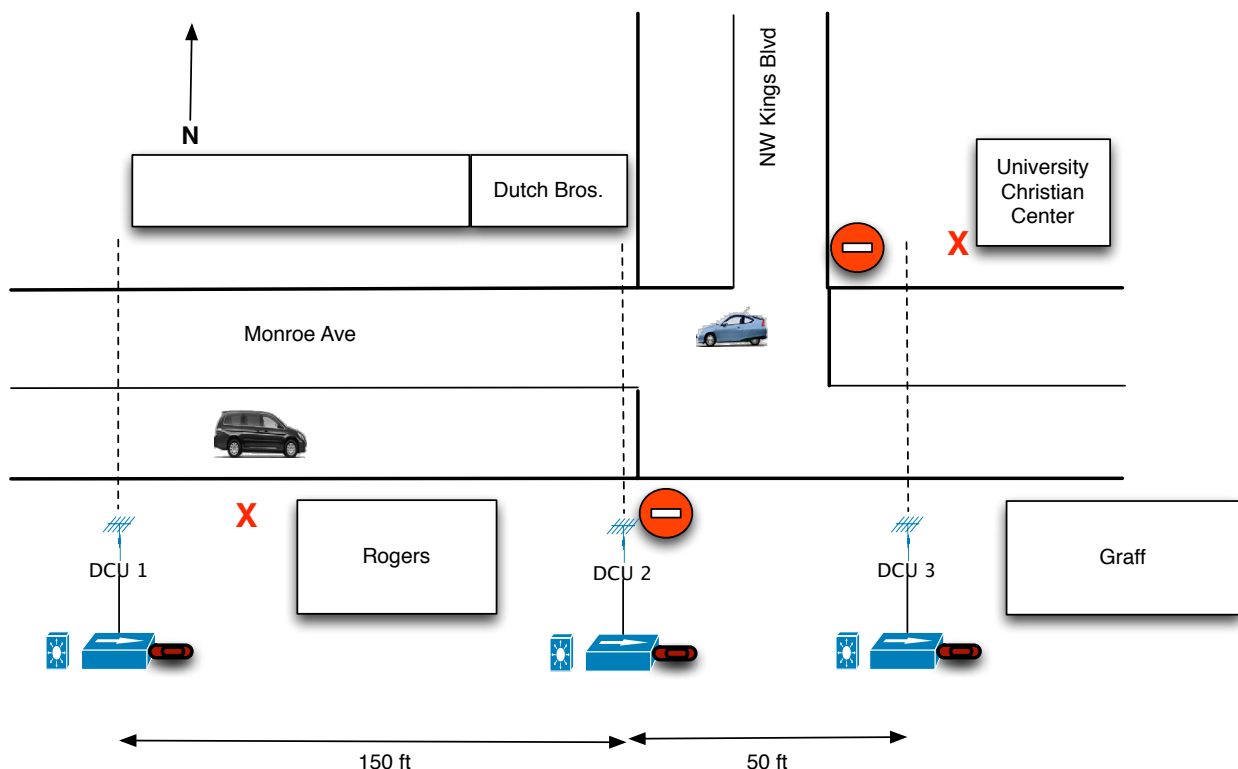
Additionally, researchers developed a portable wireless Bluetooth data collection system that is much more cost effective for short-term studies than existing products on the market.

Pedestrian performance measurement is so elusive that obtaining counts is challenging. Researchers

developed an application for an off-the-shelf product to count pedestrians using the Microsoft Kinect video game sensor.

Finally, researchers developed a method to estimate turning movement counts for most signalized intersections and some unsignalized intersections from lane-by-lane counts. This last development leverages common matrix analysis techniques to assess data collection plans for solution feasibility and provide a viable solution.

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# WELCOME NEW PACTRANS STAFF

## Welcome Melanie Paredes

Melanie Paredes joins the PacTrans team as our new Program Coordinator. Melanie will serve as the resource person for PacTrans researchers, fellows, and students on center events, seminar talks, conferences and other research needs. She will also help coordinate meetings, seminars, conferences and travel and take on grant and fiscal support.

Melanie has been with the University of Washington for more than twenty years. She's worked at the UW Department of Radiology as Facilities Coordinator, UW Division of Gastroenterology as Assistant to the Lab

Manager, UW Academic HR as Human Resources Assistant, and at the UW Payroll Office as Payroll Technician. Outside of UW, she's worked at Archdiocese of Seattle as Assistant to the HR Director.

Melanie has a B.S. in Zoology and credits in Education. She also volunteers as event coordinator of an annual ethnic Art & Culture festival at the Seattle Center and is an alumni member of the Greater Washington Alpha Phi Omega which organizes the "Adopt-A-Park" and Feeding Program.



## ABOUT PACIFIC NW TRANSPORTATION CONSORTIUM

The Pacific Northwest Transportation Consortium (PacTrans) is the Region 10 University Transportation Center (UTC) established in January 2012 with a \$6.89 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 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 U.S. 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 sustain-able solutions for the diverse transportation needs of the Pacific Northwest.



# PacTrans Board of Directors



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



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



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



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



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



**Billy Connor**  
*Associate Director*  
University of Alaska Fairbanks



**Mark Hallenbeck, M.S.**  
*Associate Director of Outreach*  
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**Ahmed Abdel-Rahim, Ph.D.**  
*Associate Director*  
University of Idaho

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Technology Transfer*  
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of Transportation



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# SAVE THE DATE: PACTRANS EVENTS

## PacTrans Regional Transportation Seminar

*Lessons Learned from Spatiotemporal Studies of Freeway Carpool Lanes*

Michael Cassidy, University of California, Berkley

**Wednesday, November 5, 2014 – 2:30 – 3:20 p.m.**

**University of Washington, Allen Library, Research Commons, Presentation Place**

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