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University Transportation Center Newsletter

IN THIS ISSUE

- 01 PacTrans 2018 Regional Transportation Conference Draws Record Attendance
- 02 PacTrans Showcases Research at ITS Washington Conference
PacTrans Director Delivers Talk at Future Forum
- 03 PacTrans 2017 Outstanding Researcher of the Year Publishes Paper on 3D Virtual Intersection Sight Distance
- 04 Three PacTrans PIs and Two PacTrans Fellows Publish Work on Inductive Learning Approach
- 05 Region 10 Student Conference
- 06 PacTrans Regional Transportation Seminar Presents: Sherif Ishak
PacTrans Seminar Series Presents Yueyue Fan
- 07 PacTrans meets with Blackberry
- 08 PacTrans External Advisory Board
PacTrans Board of Directors
- 09 Save the Date
About Pacific NW Transportation Consortium

PacTrans 2018 Regional Transportation Conference Draws Record Attendance

The Pacific Northwest Transportation Consortium (PacTrans) held its fifth annual conference on Friday, October 6, 2017 at the University of Washington's North Ballroom in the Husky Union Building. The conference focused on transportation mobility and technology with the theme of "Data Driven Mobility Solutions for the Pacific Northwest."

With over 250 in attendance, it was by far the most successful conference to date. This year was not only a success because of general attendance numbers, but also because speakers and audience members were well represented from all four states and five consortium universities in the Pacific Northwest. The conference had a great mix of academic researchers, government agencies, and private

industry professionals, and each of the fifteen speakers gave excellent presentations on a broad range of interesting topics.

Sessions covered an array of interesting topics including: A research focused PacTrans Research Showcase, a session on Technology Transfer and the transition of successful research results into professional practice, a session on Workforce Development, and finally, a listening session on emerging research directions of the future. Following the overall aim of the conference, PacTrans principal investigators and students submitted a total of 40 posters for the conference's annual poster session. For more on the conference, check out our special edition conference newsletter [here](#).



PacTrans Showcases Research at ITS Washington Conference

Several months ago, PacTrans co-sponsored the annual Intelligent Transportation Systems (ITS) Washington chapter conference. During the conference, PacTrans also had the opportunity to host one of the breakout sessions to showcase some of the great ITS research we have been engaged in. Attendees of our session head from four PacTrans Pls. University of Washington Associate Professor, Jeff Ban, presented on Urban Traffic Modeling with Mobile Sensing research. University of Washington Research Associate Professor, Ed McCormack, presented on Testing Unmanned Aircraft for Avalanche Monitoring in Difficult Conditions. University of Washington PhD Student and NSF Fellow, Elyse O'Callaghan Lewis, presented on Private Shuttles and Public Transportation: Effects of Shared Transit Stops on Travel Time and Reliability in Seattle. University of Washington PhD Student, John Ash, presented on Applications and Case Studies of Mobile Sensing for Multi-Modal Traffic.

This was a great technology transfer opportunity for PacTrans researchers. If you would like to find out more about the research that PacTrans is and has been funding over the last seven year, please visit our website by [clicking here](#).



PacTrans Director Delivers Talk at Future Forum

This past December, PacTrans Director, Yin Hai Wang, had the distinct privilege to deliver a keynote address at the Future Forum in Beijing, China. The Future Forum, initially inspired by the book, *The Singularity is Near* by Ray Kurzweil, is a cross-field nonprofit platform that promotes science and scientists in China, “it communicates science to the public, connects the scientific field with the market, and catalyzes private funds to support scientific research.”

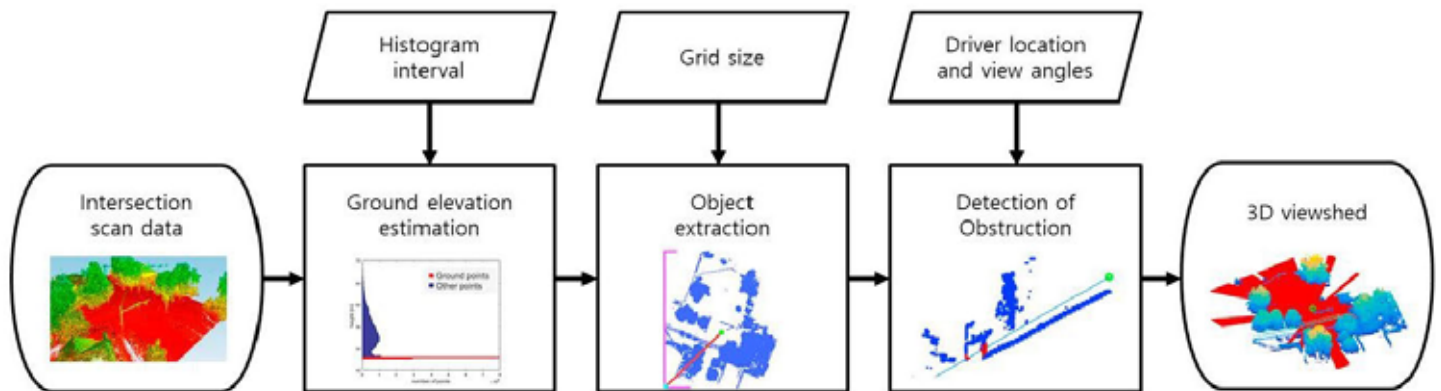
The Future Forum was established in 2015 by a group of influential scientists, educators, entrepreneurs and investors in China. Today, it has become a full-blown brand with four distinct outcomes: the Future Science Prize, Future Lectures, Think Tank Roundtable Workshop, and the Future Forum Annual Conference (this is the event where Dr. Wang keynoted).

Since its conception, Future Forum adheres to the mission of “Transform the Future with Science”, aiming to give the public nonprofit platform a deeper connotation and unique value in the fast-changing times. The Future Forum has become one of the most authoritative public science platforms in China.



RESEARCH HIGHLIGHTS

PacTrans 2017 Outstanding Researcher of the Year Publishes Paper on 3D Virtual Intersection Sight Distance



PacTrans PIs Michael Olsen and David Hurwitz, along with OSU Postdoctoral Research Associate Jung Jaehoon and two student researchers recently published a paper in Transportation Part C based on some outstanding research results from a PacTrans funded research project.

The initial project, titled *3D Virtual Sight Distance Analysis using Mobile LIDAR data*, developed a framework to utilize 3D laser scanning data to evaluate sight distances at intersections. The project compared the new framework to conventional techniques for validation, evaluated visibility changes during vehicle turning movements, considered

multi-modal visibility, and provided 3D viewsheds that can help agencies manage sight distance obstructions.

“Sight distance analyses require careful and detailed field measurements to facilitate proper engineering decision making regarding the removal of obstructions, establishment of regulatory and advisory speed limits, and the location of new access points, among numerous other purposes. However, conventional field measurements for these analyses present safety concerns because they require personnel to be in or adjacent to traffic lanes. They can also be time consuming, costly, and labor intensive. Furthermore, the predominantly

two-dimensional (2D) methods involve simplifying assumptions such as a “standard” vehicle heights and lengths without considering the wide range of vehicles and drivers present on the road.”

The experimental results demonstrated the ability of the proposed methodology to capture significantly more detail on visibility constraints when compared with conventional measurements as well as provide more flexibility in the analysis. To see more about this project and other great research currently being conducted at PacTrans, see our research page [here](#).

RESEARCH HIGHLIGHTS

About Research:

PacTrans heavily invests in mobility and safety research to address transportation issues in the region and nationally. Our consortium has at its disposal, many unique data sets, several interactive simulators, and a significant number of very productive and innovative labs. PacTrans has a diverse collection of expert researchers, as well as many of the nation's brightest students, from across the seven universities that collectively address the Strategic Goals highlighted by the USDOT (infrastructure, safety, innovation, and accountability) with a focus on data driven solutions for the diverse mobility needs of people and goods in the Pacific Northwest.

Three PacTrans PIs and Two PacTrans Fellows Publish Work on Inductive Learning Approach



Several of the PacTrans consortium institutions regularly offer fellowships to the best and brightest graduate students in our transportation programs. These students regularly participate in PacTrans funded research while their education is paid for by the center. Two Oregon State University PacTrans fellows recently had educational work published based on work they did for their fellowships. Kamilah Buker and Richie Slocum, working with PacTrans PIs Ben Mason, Michael Scott and David Hurwitz, explored an inductive learning approach to increasing student understanding of response spectra.

“Creating and interpreting earthquake response spectra are important fundamentals in earthquake engineering education. We argue that an effective approach for teaching the fundamentals of earthquake response spectra is to

use an inductive learning approach in an interactive classroom, which is well supported by engineering education literature. To demonstrate this approach we use desktop learning modules that exhibit response spectra concepts. Preliminary data based on post-class interviews with instructors supports our opinion. Notably, all interviewed instructors have chosen to adopt the inductive learning approach when teaching response spectra concepts in future iterations of their classes.”

This work was recently published in The Professional Journal of the Earthquake Engineering Research Institute. PacTrans is very proud to be able to support productive students to further their education and become leaders in the transportation industry here in the Pacific Northwest and across the country. To learn more about some of our fellows, visit our website [here](#).

STUDENTS

About Students:

PacTrans actively invests in the education of our region's students. We support outreach activities that promote STEM and engineering educations and careers from elementary school students to high school students, we sponsor seminars bringing in some of the countries leading experts in many transportation related areas, we offer fellowships to attract some of the top graduate students from around the country, and we support student travel to present research at a variety of conferences, workshop, and symposia across the nation. PacTrans also actively supports many of our student teams and organizations such as ITE student chapters, clean snowmobile, steel bridge, Hyperloop, concrete canoe, and big beam.

Region 10 Student Conference

The 2017 PacTrans Student Conference was held October 7 at the Husky Union Building (HUB), University of Washington campus. This year's student conference was one of our most successful to date, and we had over 50 students (both graduate and undergraduate) come to attend from the University of Washington, Oregon State University, University of Idaho, and the University of Alaska Fairbanks.

PacTrans Annual Student Conference aligns well with the goals of an educational organization, and at a more personal level, the student conference provides students with a more comfortable opportunity to share their research and network. The event held keynote speakers from SoundTransit and ReachNow, a panel session featuring recently-graduated transportation professionals, and a student research poster competition!

Mr. Robert Nichols, Design Engineer at Sound Transit posed an informative and exciting talk showing how big of an undertaking a project, such

as, the construction of the Brooklyn Avenue Link extension can be. Our second keynote speaker was Pete Dempster who leads strategy and market development for ReachNow. Pete challenged the attendees with an interactive and interesting discussion about real world problems of his day-to-day job. Pete invited attendees to design creative solutions for the operations of a car sharing service, while thinking about innovations with great disruptive potential, such as, electrification and shared mobility.

In the Student Panel with recent graduates, Carmen Kwan and Matt Palzkill, two University of Washington alumni who are now working as private consultants, shared with the audience their experience of transitioning from the academic environment to consulting companies. Attendees engaged in Q&A session with the panelists, who generously shared their stories from years of practices, and offered valuable career advice to students.



PacTrans Regional Transportation Seminar Presents: Sherif Ishak

The fall quarter regional transportation seminar this year was delivered by Dr. Sherif Ishak, Professor and Department Chair of Civil Engineering at the University of Alabama in Huntsville. His presentation, titled *Developing a Crash Risk Index and Detecting Driver's Engagement in Secondary Tasks from Driving Behavior Attributes and Socioeconomic Characteristics: A Naturalistic Driving Study*, discussed work on distracted driving:



"Distracted driving has long been acknowledged as a leading causes of death or injury in roadway crashes. Previous research has focused mainly on the impact of different causes of distraction on driving behavior. Very few studies attempted to detect distracted driving from driving behavior attributes. This study takes advantage of the rich SHRP 2 Naturalistic Driving Study (NDS) database to develop a model for detecting the likelihood of a driver's involvement in secondary tasks from distinctive attributes of driving behavior. Five performance attributes, namely speed, longitudinal acceleration, lateral acceleration, yaw rate, and throttle position were used to describe the driving behavior. A model was developed for each of three selected secondary tasks: calling, texting, and passenger interaction. The models were developed using a supervised feedforward Artificial Neural Network (ANN) architecture to account for the effect of inherent nonlinearity in the relationships between driving behavior and secondary tasks. The study also proposed a Crash Risk Index (CRI) to estimate the crash risk associated with the socioeconomic characteristics of drivers and their tendency to experience distracted driving."

PacTrans Seminar Series Presents Yueyue Fan

Beyond the quarterly PacTrans Regional Transportation Seminar, our Center regularly supports visitation of leaders in academic research and the transportation industry for seminar. This past November, PacTrans hosted one such seminar with Dr. Yueyue Fan, Professor of Civil and Environmental Engineering at the University of California, Davis. She delivered a talk titled *Probability Density Estimation of Travel Demand: Integrating Sensor Data with Soft Information*.

In this talk, Dr. Fan discussed a general statistical inference problem built on a network structure, with a special application in transportation. The general problem is defined as: how can one infer global network parameters (x) based on data measured on local parameters (y), with the relation between x and y built on a complex network structure? A familiar example of such problem in transportation is origin-destination (O-D) matrix estimation based on road sensor data such as traffic counts. With more traffic data become available through advanced

information technologies, we face great opportunities as well as challenges in utilizing the data. Dr. Fan showed how optimization and statistics could be combined to address challenges brought by data uncertainty and heterogeneous information types.



TECHNOLOGY TRANSFER AND PARTNERSHIPS

About Tech Transfer and Partnerships:

PacTrans serves as a collaborative platform for the consortium universities and transportation agencies in Region 10 to address regional transportation issues, envision future transportation needs, and develop sustainable solutions. As the Region 10 think tank, research engine, and training base for tomorrow's transportation leaders, PacTrans ensures desired collaboration on important regional transportation issues, including research, education, and workforce development, through problem identification, research funding, and outcome evaluation.

PacTrans meets with Blackberry

This past October, PacTrans Director, Yinhai Wang, along with PacTrans Associate Director, Jeff Ban, and several PhD students from his STAR Lab met with Andrew Walenstein, Director of Security Research and Development at BlackBerry. We discussed a number of different avenues for partnership and collaboration. While the connected and autonomous vehicle has been, and will continue to be, at the center of much discussion and research, security concerns surrounding the emergence of these new technologies has been lacking. Dr. Walenstein's primary concern is bringing these issues to the forefront and challenging researchers and the next generation of transportation professionals to be prepared and competent with these looming issues.

Of the ideas generated during our meeting, several were identified with high priority and are now initiatives that we are moving forward with. The first of those is a security seminar that will be co-sponsored by BlackBerry and PacTrans and will be hosted at the University of Washington. The intent is that this will be a regular seminar that brings in security experts from both industry and academia to speak on emerging issues and research in security. Secondly, BlackBerry offers a large number of very interesting internship opportunities all over the country. They expect candidates to be mildly literate in computer science but seek individuals whose interests and primary focuses are only tangential to what BlackBerry is currently working on. This offers BlackBerry fresh ideas and takes on new directions for their company. The final collaboration that was discussed was in regard to research. Dr. Walenstein quickly identified a number of great entry points into ongoing projects that PacTrans and the STAR Lab are already engaged in.



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Professor, Civil & Environmental Engineering
Adjunct Professor, Electrical Engineering
Director, Pacific Northwest Transportation Consortium (PacTrans)
Director and Founder, Smart Transportation Applications and Research (STAR) Laboratory
University of Washington



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Director, Center for Safety Equity in Transportation (CSET)
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University of Alaska - Fairbanks



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Affiliate Associate Professor, eScience Institute
Associate Director of Research, Pacific Northwest Transportation Consortium (PacTrans)
University of Washington



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Western Trailer
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Idaho Transportation Department

SAVE THE DATE

PacTrans Regional Transportation Seminar

Thursday, May 24, 2018

– featuring Lily Elefteriadou from the University of Florida

Regional Transportation Conference

Friday, October 12, 2018 in Fairbanks, Alaska

About Pacific NW Transportation Consortium

The Pacific Northwest Transportation Consortium (PacTrans) is the Region 10 University Transportation Center (UTC) established in January 2012 with funding from the US Department of Transportation (USDOT).

PacTrans is a combined effort of transportation professionals and educators from the University of Washington (UW), Oregon State University (OSU), the University of Alaska Fairbanks (UAF), the University of Idaho (UI), Washington State University (WSU), Boise State University (BSU), and Gonzaga University (GU). With two active centers focusing on both Safety and Mobility, 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 PacTrans program focuses on the USDOT-identified priority of Improving the Mobility of People and Goods. This priority includes the following nonexclusive topic areas:

- Increase access to opportunities that promote equity in connecting regions and communities, including urban and rural communities;
- Smart cities;
- Innovations to improve multi-modal connections, system integration, and security;
- Assistive technologies for those with physical or cognitive disabilities;
- Data modeling and analytical tools to optimize passenger and freight movements;
- Innovations in multi-modal planning and modeling for highgrowth regions;

- Novel (non-traditional or alternative) modes of transport and shared use of infrastructure; and
- Regional planning and setting of transportation priorities.

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.

Contact

Dr. Yin Hai Wang
University of Washington
More Hall, Room 112

PacTrans.org

Email: PacTrans@uw.edu
Phone: (206) 685-0395
Find us on Twitter @PacTrans UTC