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University Transportation Center Newsletter

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PacTrans: A Hub of Innovative Ideas

Fast changing trends in education, research, information dissemination, networking, and technology continuously challenged the five consortium member universities comprising the Region 10 University Transportation Center.

An ever-growing center providing qualitative training and research, the Smart Transportation Application and Research (STAR) laboratory, a PacTrans UW-based facility, was recently updated with more big screen TVs and powerful computer systems. The aim is to develop more sophisticated applications. With technological advances come changes in urban ecology. The STAR lab team is engaged in continuous research towards developing better system applications to help mitigate traffic congestion and improve traffic safety.

PacTrans constantly challenges transportation faculty, engineers, and students (both undergraduate and graduate) to contribute through what can be captured from their research in an ever-changing world that requires clean energy, a safe environment, advanced technology for everyone (for developed and under-developed countries), and transportation for all (shared smart cars and bicycles, high tech buses and trains). The objective is a clean planet.



Dr. Wang and Dr. Hurwitz Represent Oregon State University and PacTrans at CICTP 2015

The 15th COTA International Conference of Transportation Professionals (CICTP2015) took place on July 25-27, 2015 in Beijing, China. Dr. Hurwitz

chaired a session on Infrastructure Systems and presented a PacTrans-sponsored research entitled, "Driving Simulator Evaluation of Alternative

Information Signs in Oregon." Dr. Wang, on the other hand, chaired an international forum of young scholars and presented research entitled, "Understanding Interdependencies Between Networks: Toward Resilient Lifeline Infrastructure Systems for Smart Cities". Dr. Hurwitz and Dr. Wang also participated in two post conference workshops at the Southwest Jiaotong University and the Beijing University of Technology.



A Profound Experience: PacTrans STAR Lab Tour by ITS America Symposium

The Pacific Northwest Transportation Consortium (PacTrans) co-sponsored the ITS America 2015 Symposium on July 16 -17, 2015. The two-day event tackled dramatic issues including urban changes and infrastructure cost with tremendous impact on transportation, mobility, and demographic shifts. Highlights of the symposium series were focused on a growing urban population faced with issues of affordability, demographic shifts, environmental changes, transportation needs, and health. Transportation solutions were presented with more perspectives – how to better serve the people, to make their lives easier and to identify the services they need. Transportation professionals from public and private sectors and faculty members from the University of Washington (Prof. Yinhai Wang and Prof. Mark Hallenbeck)

presented relevant topics that dealt with mobility, economics, population growth, gathering of data and their use, influx of imported and exported goods, and technology. Keynote speakers included Regina Hopper, President and CEO, ITS America; Scott Kubly, Director, Seattle Department of Transportation; and Hon. Secretary Lynn Peterson, Washington State Department of Transportation. Dr. Yinhai Wang delivered his closing remarks with relevant topics focused on the research activities of the PacTrans Smart Transportation Applications & Research (STAR) laboratory.

The STAR lab expanded the curiosity of the symposium attendees with analytics (data visualization) of its on-going research activities. Kristian Henrikson, STAR lab manager, gave insights from the lab's highly



data-driven research—the UAV-based traffic data collection, Media Access Control (MAC) address sensing for multi-modal data collection, Microsoft Kinect-based pedestrian detection, and the Digital Roadway Interactive Visualization and Evaluation Network (DRIVE Net). A short glimpse of the STAR lab facility at More Hall 101 provided a profound experience to the symposium attendees.

Yinhai Wang Spoke at Georgia Tech

Big-Data-Driven Transportation Decision Making in the Smart Cities Context

Invited by the National Center for Transportation System Productivity and Management (NCTSPM), PacTrans Director and University of Washington professor of Civil and Environmental Engineering, Dr. Yinhai Wang, traveled to Georgia Institute of Technology (Georgia Tech) to present, “Big-Data-Driven Transportation Decision Making in the Smart Cities Context” at an NCTSPM seminar on August 27, 2015. In addition to leading NCTSPM, Georgia Tech is also a member of the National Center for Sustainable Transportation, a National University Transportation Center, under the direction of UC Davis.

“Transportation involves human, infrastructure, vehicle, and environmental interactions and is therefore a very complicated system,” says Dr. Wang, “Transportation activities are found affecting public health, air

quality, sustainability, etc., and thus tie to everyone’s daily life and are critical for achieving goals of Smart Cities.”

He went on to observe that transportation has typically been studied through classical methods, with typically assumptions (the ideal), limited data support, and poor computing resources. He challenged that while the theories developed through these efforts provide valuable insights in understanding transportation-related issues, they are often ineffective in large-scale transportation system analysis with massive amount of data from various sources.

He elaborated on recent advances in sensing, networking, and computing technologies. These new assets are likely to bring in new opportunities to understand transportation systems better and address those critical transportation issues in a

faster, more accountable, and more cost-effective way. To take advantage of these big data, a new theoretical framework and its supporting platform are clearly needed to integrate the quickly growing massive amount of data, typically from numerous sources of varying spatial and temporal characteristics, into the large-scale transportation problem solving and decision making processes.

Dr. Wang shared his vision and pilot research on extracting transportation big data streams from the smart cities sensor networks and demonstrated the values of these data in large-scale system analysis and decision support through an online regional-map-based data platform named Digital Roadway Interactive Visualization and Evaluation Network (DRIVE Net).

[Learn more.](#)


NCTSPM
NATIONAL CENTER FOR TRANSPORTATION
SYSTEMS PRODUCTIVITY AND MANAGEMENT
**TRANSPORTATION
SPEAKER SERIES**



08/27/2015

YINHAI WANG, PH.D.

Professor

**Director of the STAR Lab and PacTrans
University of Washington at Seattle**

THURSDAY 11 AM | MASON BDG 1133

**“BIG-DATA-DRIVEN TRANSPORTATION DECISION MAKING IN THE SMART
CITIES CONTEXT**

Delegation Visited PacTrans



The HUALAN GROUP with Dr. Yin Hai Wang and Dr. Zhi Bin Li at STAR Lab.



Discussion centered on research and collaboration.

On September 25, the PacTrans STAR lab welcomed visitors from HUALAN GROUP, an innovative construction and transportation firm with specialties in design, engineering, technology consulting, and real estate investment based in Guangxi province, China. STAR lab introduced the recent Intelligent Transportation Systems (ITS) research to the group and discussed about potential

collaboration opportunities. The lab continuously works at increasing its collaborative efforts in transportation research, and providing substantial training utilizing its software applications on traffic operations. STAR lab has become a hub of ITS research and training, exhibiting intelligent outcomes and ever-increasing collaborations.

PacTrans at the AASHTO 2015 Meeting

PacTrans representative Maria Bayya attended the 2015 Research Advisory Committee/TRB State Representative Meeting hosted by the American Association of State Highway and Transportation Officials (AASHTO) in Portland, Oregon this past July. This five day event was themed: "Creating Dynamic Research Programs through Collaboration." The Research Advisory Committee (RAC) discussed research processes and programs, drafted and approved a strategic plan, and reviewed TRB committees' activities.

Discussions revolved around issues including: RAC administration, education and training, program quality management, coordination and collaboration, transportation knowledge network, value of research, best practices and success stories. Worthy to note is the presentation of top 16 picks from the AASHTO RAC annual High Value Research submissions, candidly called SWEET SIXTEEN, which included our very own PacTrans

External Advisory Board member Ned Parrish from the Idaho Transportation Department. He presented research entitled "Development of a System for Remote Detection of Avalanches in High-Risk Locations to Enhance Traveler Safety and Mobility." This was a real-time avalanche detection project that developed/refined infrasound methods for remote detection of avalanches. The goal of the avalanche detection project was to create a speedy response to avalanche events to minimize delays and improve safety.

[Learn more.](#)



A Rewarding Tour: PacTrans Students and Faculty Visited Washington State Patrol (WSP)

A tour of the Washington State Patrol (WSP) headquarters in Olympia by John Ash, Ruimin Ke, and Prof. Yinhai Wang on July 22, provided a glimpse of WSP's everyday tasks and services. The WSP's hangar was the main part of the tour led by Lt. Nobach and Sgt. Korthuis-Smith with attendees given information about the agency's aerial law enforcement program. As one of the State's law

enforcement agencies, WSP provides not only highway safety, but also focuses on protection of life, property and the environment. It has a database of criminal records, a crime laboratory, and a staff with varied law enforcement specialties, crime and fire prevention, and highway safety. The agency's top priority among its goals is keeping Washington State's roadways and ferries safe.



Ruimin Ke and John Ash being toured by WSP personnel.



UW Transportation Faculty Retreat at Sun Mountain Lodge

The UW transportation faculty came together for two days to hash out and discuss course and degree requirements, work on strategic plans to recruit graduate students, discuss research collaborations, faculty hiring plans, and put together a sustainable structure for academic programs and curriculum. These two days at the Sun Mountain Lodge, from September 16 and 17, turned out to be productive and fruitful as they tackled transportation research and academics and what that looks like in a world challenged by evolving technology and innovation.



New Track – Construction Management Occupational Safety and Health

CMOSH (Construction Management Occupational Safety and Health) is an exciting new track within the Master of Science in Construction Management degree at the University of Washington. Transportation students

wanting to incorporate health and safety in their field may be interested in this track to work toward true project success.

[View](#) more information about the CMOSH track.

NEWS & EVENTS

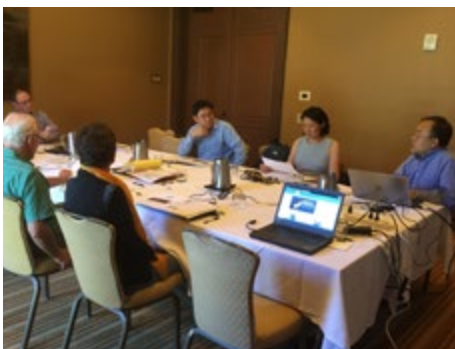
Dr. Hurwitz Receives Recognition from Oregon State University for Contributions to Outreach and Engagement



Dr. David Hurwitz was nominated for the OSU Vice Provost's Award for Excellence – Strategic Impact Award. He received an Honorable Mention. Notification of the recognition described Dr. Hurwitz's outreach and engagement efforts as being, "clearly of high quality" and that the Division of Outreach and Engagement, "continues to be impressed by his unique contribution to OSU and the outreach and engagement mission".

Dr. Brown Receives the Oregon State University Faculty Teaching Excellence Award

Dr. Shane Brown received the Oregon State University Faculty Teaching Excellence Award in September 2015. He was chosen for this award based on his exceptional effort to ensure the quality of the students' classroom experience, high standards for the rigor and currency of course content and the level of student performance, innovative teaching, direct and significant impact upon and involvement with students, and original and scholarly publications in nationally recognized and refereed journals or other professional outlets. Information about the award and other University award recipients can be found at <http://oregonstate.edu/events/universityday/award-recipients-amp-nomination-process>



PacTrans Staff Retreat

The PacTrans staff and Board of Directors were at it again, ie., putting their time, effort, and mind together to discuss past activities of the center, and to lay out a strategic plan to improve efficiency, productivity, and administrative operations with the goal of making PacTrans a true Region 10 leader in research, education, outreach, workforce development and technology transfer. The goal of optimizing the administration team and standardizing procedures and processes became the center of dynamic discussion of interest among the participants making sure that the right infrastructure is in place for the center to operate sustainably and competitively. This was a two-day event on September 9-10, 2015 at the Suncadia Resort in Cle Elum, Washington.

WSU Student Awarded Dwight David Eisenhower Graduate Fellowship



James Amundsen, recent Washington State University BS in Civil Engineering graduate, received the 2015 Dwight David Eisenhower Graduate Fellowship. The Dwight David Eisenhower Transportation Fellowship Program competitively awards fellowships to students who are pursuing transportation-related degrees, and attracts the brightest minds to the field of transportation and research while advancing workforce development. Amundsen will begin his graduate studies at WSU this semester and will perform a research assistantship under Dr. Haifang Wen, focusing on the evaluation of the effects of recycled asphalt pavement (RAP) and recycled asphalt shingles (RAS) on the fatigue performance of hot-mix and warm-mix asphalt.

The UAF Steel Bridge – Indeed a Winning Entry

Students of the College of Engineering & Mines at the University of Alaska Fairbanks garnered the first place in all categories at the Regional Steel Bridge Competition at the American Society of Civil Engineers (ASCE) Pacific Northwest Conference. Every year, ASCE establishes a new set of rules, which pose a great challenge to the competing University students. The UAF students built their bridge in less than seventeen minutes by three students of their team. The bridge weighed less than 120 pounds. Their steel bridge met all the category requirements on lightness, stiffness, construction speed, display, efficiency, and economy. The team went to the national competition last May 22-23.



Photo by JR Ancheta/AUF

A Leading Edge: Developing Supply Chain Design, Analysis, and Management Expertise

The Supply Chain Transportation online Master's program helps students advance their careers by acquiring the skills they need to improve end-to-end logistics operations within the world's leading companies. The program teaches the critical elements that form the foundation of an effective international supply chain operation.

Students learn how leading firms implement best practices in logistics and information technology to establish the sort of supply chain ecosystem that delivers sustainable competitive advantage. They learn about operations not only in an idealized environment, but in the contemporary environment where transportation disruptions are common, travel is unreliable, and prices change. The program also features courses on how the finance function can support supply chain excellence and how to design and manage facilities that optimize the use of a firm's resources. Students also learn how to design a global performance management program that will help their organizations identify and exceed its business

objectives. The program culminates with two practicums in which students explore a subject in the field that is of particular interest and relevance to them.

The program's core curriculum is comprised of interdisciplinary engineering and business courses that have been designed specifically to develop supply chain design, analysis and management expertise. The courses address the breadth of capabilities required to orchestrate the operations of a leading-edge supply chain, how to use uncertainties as an advantage, and how to use this knowledge to drive proactive change in a supply chain or transportation organization.

The two-year program is designed for working professionals who, after a one-week residency on campus, take courses online, including real-time sessions with the instructor and their classmates once a week.

For more information on the program, including curriculum and instructors, please visit: <http://www.supply-chain-transportation.uw.edu/>

From Across the Globe



On August 14, Dr. Simon Washington, ASTRA Chair at the Queensland University of Technology in Brisbane, Australia, visited PacTrans and delivered a talk on "The Effect of Government Policy on the Promotion of Energy Efficient Vehicles."

Dr. Washington contributes

to the fields of behavioral econometrics in transport safety and risk analysis, urban planning, evaluation, and travel behavior. In his short seminar, he talked about the wide range of government policies that have been implemented around the world to increase demand

for Energy Efficient Vehicles (EEVs), including cash rebates, reduced sales taxes, registration fee waivers, and toll road exemptions. He said that despite these efforts, the available literature analyzing the effects of these incentive policies on EEV demand is quite limited. Further complicating the matter is that EEV marketplaces are dynamic, and sale prices of EEVs may fluctuate in response to government incentives, since increase demand can influence market forces to in turn increase EEV prices. In his presentation, he said that he examines and estimates the effects of different types of government incentives on both EEV demand (market and fleet penetration), and EEV price premiums across fifteen metropolitan regions from 2008 to 2012.

RESEARCH

Dr. Anne Vernez-Moudon, PI on “**Safe Main Street Highways** (SMSh),” has recently shared progress made on this project, focusing on the 5,854 pedestrian and bike collisions that occurred within 100m of WSDOT designated Main Street Highways - 14.13% of the 41,435 pedestrian and bike collisions in the state (year 2001 – 2012). Prof. Vernez-Moudon said that analyses of the data will yield tools for WSDOT to prioritize future safety countermeasures on the State’s Main Street Highways. The overall goal of the project is to assist in complying with Washington State Strategic Highway Safety Plan of zero fatality and serious injury by 2030, and in reducing the number of pedestrian and bicyclists involved in motor-vehicle collisions on state highways.

Two doctoral students are working on the project - Eric J. Howard, Ph.C., and Mingyu Kang, M.C.P.

Contact: Dr. Anne Vernez-Moudon, moudon@uw.edu



Passing Zone Behavior and Sight Distance on Rural Highways —Evaluation of Crash Risk and Safety under Different Geometric Conditions

This research is a joint effort of University of Alaska Fairbanks and University of Idaho, to address the safety concerns related to driver behavior in passing zones on two-lane rural roads without diminishing roadway efficiency. The research methods include both field and driving simulator studies. First, a mobile video data collection system is being used by the University of Alaska Fairbanks to collect real-world passing maneuvers at known problem

locations in Alaska. Vehicle trajectory data will be extracted from the video and analyzed to determine the second-by-second speeds and locations of vehicles during passing maneuvers. These data will be used to study the effective use of passing areas, differential rates of speeds, maneuvers or trajectory changes made by oncoming vehicles, and spatial variations in passing maneuver critical points. Second, a multi-phase driving simulator study is

being conducted at the University of Idaho’s Human-In-The-Loop Simulation Lab to capture driver passing decisions under varying geometric and environmental conditions. The collected simulator data will be supplemented with the collection of driver demographic data and participant opinions and perspectives.

Contact: Nathan Belz, npbelt@alaska.edu



Passing zone on a compound curve (Seward Highway along Turnagain Arm, Alaska) illustrated how environmental and geometric conditions affect available and usable sight distance.



A motorist passes another vehicle in a “double yellow” striped area situated on a long vertical curve on the Parks Highway (near Cantwell, Alaska).



Driving Simulator at Human-In-The-Loop Simulation Laboratory, University of Idaho

CCE Faculty Members Conduct Research in Nepal

This year, CCE faculty members Ben Mason, Andre Barbosa, and Dan Gillins traveled to Nepal as part of an effort to collect data following the devastating earthquake that occurred on April 25, 2015. The 7.8-magnitude earthquake, known as the Gorkha earthquake, was the worst natural disaster for the region in more than 80 years.

During his first visit to Nepal in late May, Mason, along with CCE post-doctoral researcher Deepak Rayamajhi, and Eric Thompson of the United States Geological Survey, investigated liquefaction around the Kathmandu Valley. Liquefaction is a phenomenon in which saturated soil behaves like a liquid in response to a sudden event, such as an earthquake. The goal of the trip was to perform quick reconnaissance and develop a report outlining the initial liquefaction risks found in the Kathmandu Valley.

Mason traveled to Nepal with the GEER team, which is part of the Geotechnical Extreme Events Reconnaissance Association. The association coordinates National Science Foundation efforts to capture perishable data immediately following the occurrence of extreme events, such as the recent Nepal earthquake.

The goal of Mason's second visit was to develop more complete case histories, establish valuable local contacts, and form seed ideas for future research and collaborations. Rayamajhi and Domniki Asimaki of

Caltech assisted Mason. The team investigated ground failure, topographic effects, and basin effects, and his research will help local efforts to prepare for similar events in the Pacific Northwest.

the reflected light from a laser on a particular target. Barbosa also collaborated with other researchers from the US, Italy, Portugal, and Nepal in his research. In collecting the data, Barbosa provided valu-

There are many similarities between the types of expected earthquakes and the types of soil deposits and geologic formations in Nepal and Oregon," said Mason, "so this earthquake is a particularly important learning opportunity for increasing the seismic resiliency of Oregon."

In July 2015, Barbosa traveled to Nepal as part of a National Science Foundation-Rapid Response Research (NSF-RAPID) team. In addition to Barbosa (principal investigator), the Oregon State University NSF-RAPID team included faculty members Michael Olsen (co-principal investigator, non-traveling) and Dan Gillins, as well as Rajendra Soti, Patrick Burns, and Matthew Gillins.

In Nepal, Barbosa and his team assessed the damage of reinforced concrete structures with masonry infills as well as masonry buildings by acquiring structural data through ambient vibration testing, ground-based lidar, and other traditional methods. Lidar is a technology that calculates distance by analyzing

able information to assist the local rebuilding efforts in Nepal and also acquired pertinent data that will be used to assess current US guidelines on existing structures.

This post-earthquake reconnaissance missions by Mason, Barbosa, Olsen, and Gillins, not only allowed them to share their expertise with those in Nepal and to develop international connections, but also allowed them to impart their valuable experiences from the field directly with their students in CCE.

See also: <http://bit.ly/1jAivJb> for the NSF announcement of the OSU teams selection.

PacTrans Board of Directors



Yinhai Wang, PhD
Professor, Transportation Engineering
 Department of Civil & Environmental Engineering
Director, Pacific Northwest Transportation Consortium (PacTrans), Region 10, UTC
Director and Founder, Smart Transportation Applications and Research (STAR) Laboratory
 University of Washington



Chris A. Bell, PhD
Associate School Head and Professor
 Department of Civil & Construction Engineering
Associate Director, PacTrans
 Oregon State University



Linda Ng Boyle, PhD
Professor and Chair, Department of Industrial & Systems Engineering
Professor, Transportation Engineering, Department of Civil & Environmental Engineering
Associate Director of Research, PacTrans
 University of Washington



Billy Connor, PE
Director, Alaska University Transportation Center (AUTC)
Associate Director, PacTrans
 University of Alaska - Fairbanks



Anne Vernez-Moudon, PhD
Professor, Urban Design and Planning
Professor, Architecture
Professor, Landscape Architecture
Adjunct Professor, Civil & Environmental Engineering
Adjunct Professor, Epidemiology
Director, Urban Form Lab (UFL)
Associate Director of Education, PacTrans
 University of Washington



Kenneth L. Casavant, PhD
Professor and Agricultural Economist
 School of Economic Sciences
Associate Director, PacTrans
 Washington State University
Adjunct Professor, UGPTI,
 North Dakota State University
Director, Freight Policy Transportation Institute

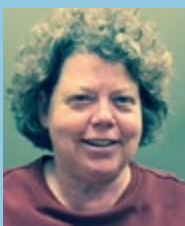


Mark E. Hallenbeck, MS
Director, Washington State Transportation Center (TRAC)
Associate Director of Outreach, PacTrans
 University of Washington



Ahmed Abdel-Rahim, PhD
Associate Professor of Transportation
 Department of Civil Engineering
Associate Director, PacTrans
 University of Idaho

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Director, Research
Research Manager for Design, Safety, Environment & Safety
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Charlie Howard
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Carolyn Morehouse
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 Alaska Department of Transportation & Public Facilities (AKDOT&PF)



Michael Bufalino
Research Manager
 Oregon Department of Transportation (ODOT)



Wayne Kittelson
Principal
 Kittelson & Associates, Inc.



Ned Parrish
Research Program Manager
 Idaho Transportation Department (ITD)
 Jerry Whitehead
 President & Owner
 Western Trailers
 Boise, ID



Scott Drumm
Manager, Department of Research and Strategic Analysis
 Port of Portland



Edward Mantey
Senior Vice President
 Product Development & Technical Administration & Planning Office
 Toyota Technical Center
 Toyota Motor Engineering & Manufacturing, North America, Inc.



Jerry Whitehead
 President & Owner
 Western Trailers
 Boise, ID

ABOUT PACIFIC NORTHWEST 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.

Contributors

Prof. David Hurwitz, OSU
Prof. Nathan Belz, UFA
Prof. Anne Vernez-Moudon, UW
Prof. Bill Keough, UW

Maria Bayya, UW
Melanie Paredes, UW
Cole Kopca, UW

Contact

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

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

PacTrans.org

