



# PacTrans

## PacTrans Region 10 Transportation Conference

### University Transportation Center Newsletter

#### SPECIAL ISSUE NOVEMBER 2014

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## The IOUs of Safety – Infrastructure, Operations, and Users

October 17, 2014

During a day packed with the latest research and innovation in transportation safety, over 170 attendees gathered at the University of Washington on October 17th for the 2014 PacTrans Regional Transportation conference. Participants came from across the Northwest, representing transportation agencies, universities, and private organizations from Alaska, Oregon, Idaho, and Washington.

Dr. Yinhai Wang, director of PacTrans, welcomed conference-goers in his opening remarks and previewed the comprehensive line-up of speakers and dynamic sessions. He also highlighted the importance of technology transfer, particularly in light of this year's theme in designing safe infrastructure, safe operations, and safe users.

Dr. John Milton, director of Enterprise Risk and Safety Management at Washington State Department of Transportation (WSDOT) joined Dr. Wang in opening the conference. Dr. Milton discussed Target Zero, Washington's Strategic Highway Safety Plan, and the value of partnering with PacTrans for both research and implementation. "What you do saves lives and reduces crashes," Dr. Milton said. "These discussions are where gems are started, where research discussions become reality."

Over the day, some of the brightest minds in transportation discussed how research, technology, education, and a changing workforce function in improving traffic safety and lives.



Yinhai Wang (left) and John Milton (right) welcoming conference attendees.

# CONFERENCE AGENDA

- 8:30 AM **Welcome** Yinhai Wang, *PacTrans Director and Professor, University of Washington*
- 8:45 AM **Welcome** John Milton, *Director of Enterprise Risk and Safety Management, Washington State Department of Transportation*
- 9:00 AM **Keynote Address: Naturalistic Driving Study** John Campbell, *Research Leader with Battelle's Center for Human Performance and Safety*
- 10:00 AM **Brief introductions by Pls for Poster Session** David Hurwitz, *Assistant Professor, Oregon State University*

11:00 AM **Research Session: Preparing for a Driverless World** Moderated by Edward Mantey, *Senior Vice President Vehicle Planning, Corporate Strategy, Technical Administration, Toyota Technical Center*

11:10 AM **User Safety: From the Perspective of the Cyclist/Pedestrian** Dongho Chang, *Traffic Engineer, City of Seattle*

11:20 AM **User Safety: From the Perspective of the Driver** Ted Trepanier, *Executive Director, Inrix*

11:30 AM **Infrastructure Safety: From the Perspective of Autonomy** Guoyaun Wu, *Research Engineer, University of California, Riverside*

11:40 AM **Operations Safety: From the Perspective of State Research Needs** Michael Bufalino, *Research Manager, Oregon Department of Transportation*

12:00 noon **Lunch and Poster Session** David Hurwitz, *Assistant Professor, Oregon State University*

1:00 PM **Workforce Development Panel Discussion** Moderated by Bruce Haldors, *CEO, Transpogroup*

1:10 PM **DOTs** Carolyn Morehouse, *Chief of Research Development and Technology Transfer, Alaska Department of Transportation and Public Facilities*

1:20 PM **Professional Organizations** Jim O'Brien, *Managing Director, American Society of Civil Engineers*

1:30 PM **Industry** Wayne Kittelson, *Principal, Kittelson & Associates, Inc.*

1:40 PM **CUTC/Universities** Teresa Adams, *Professor, University of Wisconsin–Madison, Director and Principal Investigator, National Center for Freight and Infrastructure Research and Education*

2:00 PM **Tech Transfer Presentations** Moderated by Doug Brodin, *Research Manager, Washington State Department of Transportation*

2:05 PM **DOT** Denise Dunn, *Grants Manager, University Transportation Centers (UTC) Program Office, Office of the Assistant Secretary for Research and Technology (OST-R), US Department of Transportation*

2:15 PM **Education Project** Kevin Chang, *Assistant Professor, University of Idaho*

2:25 PM **Idaho Snowmobile** Dan Cordon, *Clinical Faculty, University of Idaho*

3:00 PM **Breakout Groups** Strategic Directions, Moderated by Anne Goodchild, *Associate Professor, University of Washington*

- **Infrastructure**
- **Operations**
- **Users**

4:30 PM **Report Back/Closing Remarks** Anne Goodchild and Yinhai Wang, *University of Washington*

5:00 PM **Social Hour and Networking**

# SESSIONS

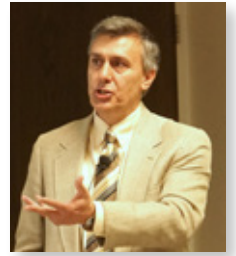
## KEYNOTE SESSION

### SHRP2 Naturalistic Driving Study: Summary and Future Opportunities for Researchers

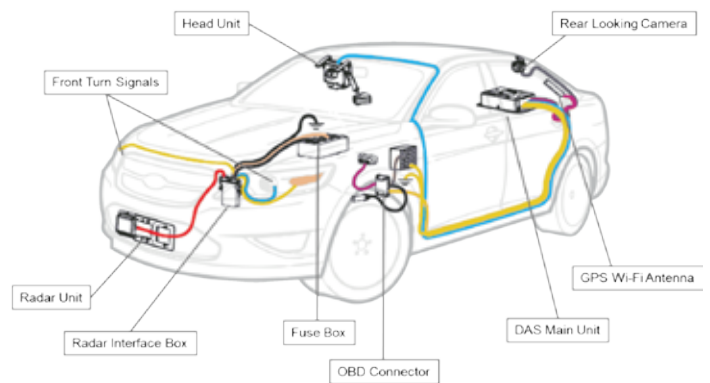
**John Campbell, Research Leader at Battelle's Center for Human Performance and Safety**

The SHRP 2 Naturalistic Driving Study (NDS), is the largest naturalistic driving study ever conducted, and includes over 3,100 drivers and 2.5 million trips. This study recognizes that existing sources of information about driver behavior and performance have some basic shortcomings, and addresses a need for understanding how the driver interacts with and adapts to the vehicle, traffic environment, roadway characteristics, traffic control devices, and the environment.

A huge database was amassed from the 3,958 vehicle-years of data collected, and ongoing enhancements will link the NDS roadway data. The data presents a variety of opportunities and benefits for researchers and practitioners to improve future roadway design and traffic safety, including a better understanding of baseline driving behaviors and unsafe behaviors and traffic events.



#### Equipment Installed into Participant Vehicles



## Introduction to Poster Session by Pls

**David Hurwitz, Assistant Professor, Oregon State University**

To build anticipation and introduce the poster session, Pls were charged with a unique mission: impress the audience with a preview of their research in an artistic format, in 60 seconds or less. The creative interpretations ran the gamut, from poems to pantomimes to drawing on the immortal words of Mike Tyson for bridge safety. Transportation engineers are truly a multitalented bunch.





## RESEARCH SESSIONS



## RESEARCH PANEL SESSION

# Preparing for a Driverless World

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

Edward Mantey, moderator for the research panel session and member of the PacTrans External Advisory Board, introduced Toyota's Collaborative Safety Research Center. Started in 2011, the center makes safety research public to benefit all of society. Mantey announced they will deploy automated highway driving assist next year, which will include a camera, radar and other sensors, and will even apply the brakes if drivers do not in time.

## INRIX SAFETY RESEARCH

## User Safety: From the Perspective of the Driver

**Ted Trepanier, *Executive Director, Inrix***

Inrix is the leading global provider of traffic information, analytics, and connected car services. Ted Trepanier explained that “we’re moving from just being traffic data to being data services that are all about movement, and that means across modes.” Within the last year, Inrix has made speed and travel time data much more granular with their innovative XD Segments, one mile in length at maximum, which can even provide sub-segment data such as changes in speed within a segment.

Another innovation based on Inrix's data was the Incident Detection Application, developed at Purdue, to address the dangers of drivers running into the back of queues in Indiana. To determine where there is a risk of a crash, a real-time dashboard was created to show where there are speed shifts downward.



## INRIX XD Segments

- Purpose built for dynamic traffic reporting
- Function precisely like TMC segments
  - Fixed segments, fully populated data, updated every minute
- Key Benefits of XD Segments
  - ~40% More Coverage nationally – large increases in ramps and arterials
  - Better segment granularity – typical segment length ~1 mile (1.7 mile max)
  - Eliminate gaps and overlaps endemic in TMC segments
  - Not dependent upon TMC Consortium for codes
  - Sub-segment granularity optional – data and tiles



## Infrastructure Safety: From the Perspective of Autonomy

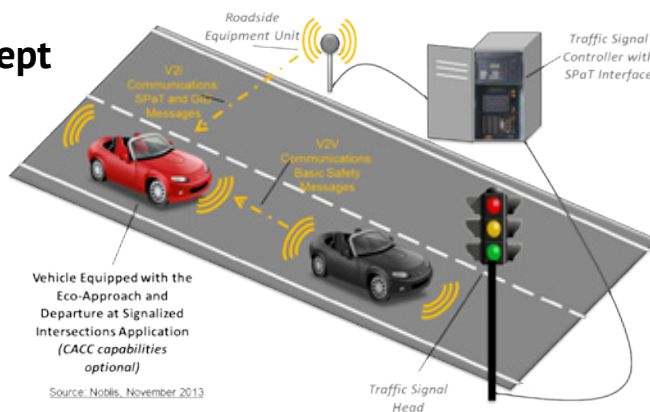
### What Can We Gain from a Driverless World? From the Perspective of Energy/Emissions

**Guoyaun Wu, Assistant Research Engineer, University of California, Riverside**

Dr. Guoyaun Wu discussed safety through the lens of energy and emissions reduction and other potential benefits to be gained in a driverless world. Automated and autonomous vehicles are capable of sensing the environment and navigate without human input, fulfilling the transportation needs of traditional vehicles. Partial or full levels of vehicle automation can help with traffic system operations, in particular safety. Dr. Wu asserted that for traffic operations with autonomous vehicles to have significant impact, communication or connectivity must be a part of the equation. Connected automated vehicles will likely have greater improvements in mobility and environment compared with autonomous vehicles.



### Basic Concept

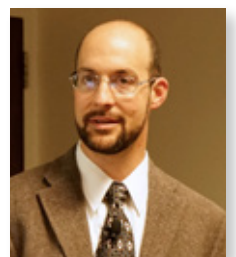




## Operations Safety: From the Perspective of State Research Needs

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

Each state department of transportation has a research office, Michael Bufalino explained, and “what we do is try to identify research that will change the practice of providing for transportation to all of society.” Traditionally it has been infrastructure-driven, but increasingly the Oregon Department of Transportation (ODOT) is seeking solutions to improve operations in a safe way.

Oregon’s research priorities include a focus on results that will be used to address a well-defined problem in transportation. The state seeks research ideas that enhance transportation safety, enhance mobility, access, or reliability, or leads to efficiencies, cost savings and cost avoidance. With transportation safety as a research priority, and a growing interest in using operational solutions to manage the existing system, ODOT continues to explore the safety implications of traffic operations innovation.



**Oregon Department of Transportation**

**Current Research has more Safety Potential**

- Optimal Timing and Detection Practices for Red Clearance Extensions
- Road Map for Connected Vehicle/Cooperative Systems
- Evaluation of Weather Based Variable Speed Limit Systems

# WORKFORCE DEVELOPMENT

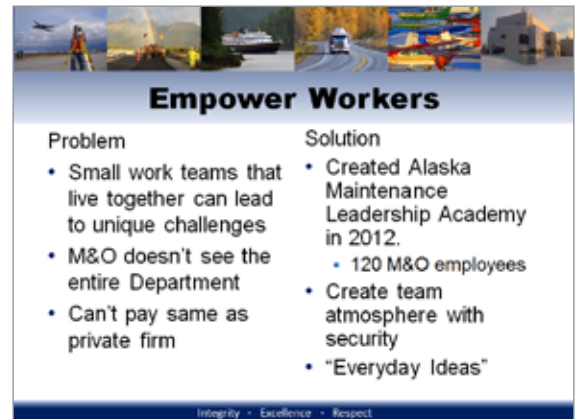
## DOTs



### **Carolyn Morehouse, Chief of Research Development & Technology Transfer, Alaska Department of Transportation & Public Facilities**

For Alaska Department of Transportation & Public Facilities (ADOT&PF), fostering a culture of safety is an important goal for fiscal year 2016. Recent developments toward this goal include the appointment of a safety coordinator to ensure compliance with worker safety rules and oversee equipment training. A new maintenance and operations (M&O) manual was introduced with many safety and environmental best practices, and a training program on new satellite radios was also implemented.

In terms of workforce development, the University of Alaska, Fairbanks worked with ADOT&PF in a research project to address challenges within M&O. They created a Leadership Academy in 2012 for M&O staff, which covers such topics as the budget, leadership development, team building, and soft skills. Another solution ADOT&PF developed was “Everyday Ideas,” a website where any employee can submit recommendations to management for consideration, which ultimately resulted in cost savings.



**Empower Workers**

Problem	Solution
<ul style="list-style-type: none"><li>• Small work teams that live together can lead to unique challenges</li><li>• M&amp;O doesn't see the entire Department</li><li>• Can't pay same as private firm</li></ul>	<ul style="list-style-type: none"><li>• Created Alaska Maintenance Leadership Academy in 2012.<ul style="list-style-type: none"><li>• 120 M&amp;O employees</li></ul></li><li>• Create team atmosphere with security</li><li>• “Everyday Ideas”</li></ul>

Integrity • Excellence • Respect

## Professional Organizations



### **James O'Brien, Managing Director, American Society of Civil Engineers**

In his overview of the future growth of the civil engineering profession, James O'Brien gave a rousing talk that called on engineers to join in workforce development. Acknowledging the need to launch research into practice, O'Brien said “I offer this corollary: we need to get our students deployed into practice, because our students today are our engineers tomorrow.” Further challenging attendees, he asked the audience what they planned to do with the contacts and knowledge they have gained at the conference. “You are the ultimate workforce developer,” O'Brien said.

Within the next 20 years, an aging U.S. infrastructure points to a 20 percent increase in civil engineering jobs, while current degree data indicates levels far below what is required to meet this need. To face this challenge, engineers need to better express how great civil engineering is, and how exciting it is to have multimodal transportation systems to inspire future engineers.

#### **US Bureau of Labor Statistics**

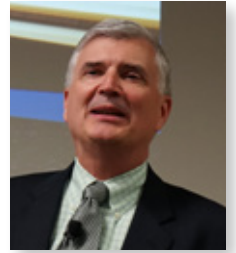
- Aging US Infrastructure points to 20% increase in civil engineering jobs (2012-2022)
- 2012 = 273,000 jobs
- 2022 = additional 53,700 jobs

# WORKFORCE DEVELOPMENT

## Private Industry

**Wayne Kittelson, *Principal, Kittelson and Associates, Inc.***

In the field of transportation, Wayne Kittelson explained we are at a transformational point driven by advances in technology and big data. In perhaps ten years, we will live in a world where cars will come off the assembly line and will not crash. The field is also getting broader, with the elements of IT, behavioral science, and industrial/systems engineering crossing the boundaries into transportation engineering. In this context, one of the workforce challenges we face is current practice in many schools and workplaces requires fundamental changes in planning, design and operations to meet the needs of the future.



### Workforce Challenges

- **Planning**
  - Near, Mid-, and Long-Term Forecasting
  - Incorporating Reliability
  - Policy Directions (Climate Change, Finance,...)
- **Design**
  - Standards
  - Staging
  - Re-purposing
- **Operations**
  - First Order Assumptions
  - Modal Integration
  - Systemwide Analysis

Employers can respond to the ambiguity of the future by creating opportunities for different experiences for staff, provide collaborative work environments, and participate in research. For educators, Kittelson recommends reconsidering degree requirements, since most are “built on what we were, not where we are going.” Students should also be encouraged to engage in internships, which can be viewed as a two-way learning experience for both the student and the practitioner who is exposed to the student’s academic studies.

## CUTC/Universities



**Teresa Adams, *Professor, University of Wisconsin, Madison***

As past president of the Council of University Transportation Centers, Dr. Teresa Adams co-chaired the National Transportation Workforce Summit in 2012, which was the first time the Department of Labor, Department of Education, Department of Transportation, industry and labor organizations, and technical and professional schools were brought together in a transportation workforce conference. The summit established a Framework for Action focused on three stages of workforce development: career

awareness, the transition from post-secondary education to the workplace, and retention and continuing education.

The framework defines overarching goals for improving transportation workforce development and addresses the challenges that impede achieving those goals. To help reach these goals within the framework, universities should focus on identifying and matching competencies in the workforce with a curriculum that fosters these competencies in students. Universities can also coordinate access to quality training and build training capacity at all levels. Regional Centers can aid in coordinating strategic workforce efforts and stimulate partnerships across organizations.



### Framework for Action Pathways to the Future

The Summit established 12 goals.

↓ Challenges,

↑ Strategies,

↗ Immediate Actions

◻ Implementing Agencies



# TECH TRANSFER PRESENTATIONS

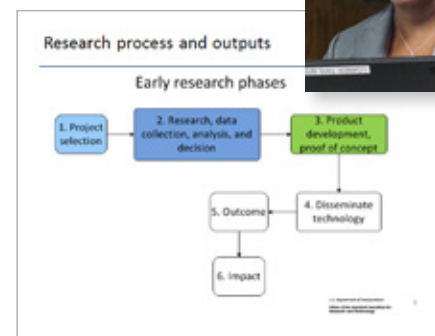
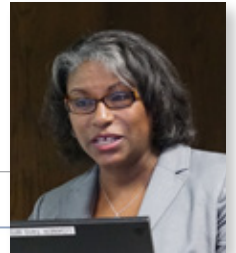


**Moderated by Doug Brodin,**  
*Research Manager, Washington State Department of Transportation*

## Technology Transfer's Role in the Research Process

**Denise Dunn, Federal Grants Manager, US Department of Transportation**

Denise Dunn highlighted the value of starting your research with the end in mind when considering technology transfer's role in the research process. One way to describe technology transfer is the process by which existing knowledge, facilities, or capabilities developed with federal funding are transferred and utilized to fulfill public and private needs. Often it entails sharing research with those who can use it through the internet, research publications, or other channels. At a high level, the outputs of research can fall into two categories, direct and indirect. A direct output is a type of technology that produces a tangible product, while an indirect output may result in a manuscript or technical report. To facilitate technology transfer, researchers can consider best practices throughout the research process, which include identifying stakeholders and research outputs, creating engagement plans with end-users, and protecting technologies through IP (intellectual property) actions.



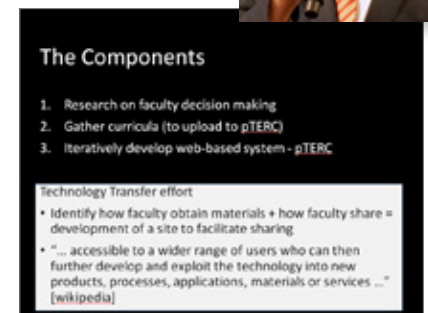
## pTERC – PacTrans Transportation Education Resource Center

**Kevin Chang, Assistant Professor, University of Idaho**

While development of an abundance of learning tools and teaching methods have been shown to be an effective means of improving student learning and other important educational outcomes, these efforts have been limited by inefficiencies associated with duplicating development efforts. Dr. Kevin Chang discussed the PacTrans multi-institution education project and the development of pTERC, PacTrans Transportation Education Resource Center.



Although a great deal of high-quality transportation engineering educational materials exists, it is largely unavailable to other faculty. The research team sought to uncover the best way to encourage the dissemination of curriculum materials across institutions, as well as how transportation faculty make decisions on educational resources used in the classroom. They also envisioned pTERC, a web-based platform where faculty can share and search for material. Preliminary findings indicate that faculty get resources mostly from peers and nearly always modify the resource to fit their own need and style.



## Idaho Clean Snowmobile

**Dan Cordon, Clinical Faculty, University of Idaho**

Pop quiz on thermal energy! We are not often taught about technology transfer in school, Dr. Dan Cordon said, and the concept could be more readily grasped in terms engineers would understand. By considering technology transfer in the framework of heat transfer, Dr. Cordon led the audience in a creative exercise on how the characteristics of convection, radiation, and conduction related to types of technology transfer. Attendees broke into small groups to discuss and reported back to the group ideas for technology transfer, including social media, videos, internships, and websites.





# CONFERENCE SCENES



Ali Hajbabaie asks a question of a presentation panel.



Ahmed Abdel-Rahim listens intently while leading a breakout session.



A view of the packed dining room surrounded by posters.



At left: Salvatore Antonio Biancardi looks on during a discussion.



Conference attendees discuss research at the poster session.



Mark Hallenback seeks input during a breakout group.



An Innova Dash all-electric micro vehicle was on display.



# ANNUAL LEADERSHIP MEETING

The PacTrans External Advisory Board and the PacTrans Board of Directors met on October 16<sup>th</sup> at the University of Washington in Seattle. The two boards hold a joint annual meeting to provide strategic guidance to PacTrans leaders. Discussed at the meeting was PacTrans' 2014-15 implementation plan, ideas for building new partnerships, how to foster technology transfer activities, and the vision for important regional safety issues.

## PacTrans Board of Directors

**Yinhai Wang**, Ph.D.,

*Director*

University of Washington

**Linda Boyle**, Ph.D.

*Associate Director of Research*

University of Washington

**Ahmed Abdel-Rahim**, Ph.D.

*Associate Director, University of Idaho*

**Chris A. Bell**, Ph.D.

*Associate Director*

Oregon State University

**Kenneth L. Casavant**, Ph.D.

*Associate Director*

Washington State University

**Billy Connor**, M.S.

*Associate Director*

University of Alaska, Fairbanks

**Mark Hallenbeck**, M.S.

*Associate Director of Outreach*

University of Washington

**Anne Vernez-Moudon**, Ph.D.

*Associate Director of Education*

University of Washington

## PacTrans External Advisory Board

**Rhonda Brooks**

*Acting Director of Research and*

*Library Services*

Washington State Department of

Transportation

**Michael Bufalino**

*Research Manager*

Oregon Department of Transporta-

*tion (ODOT)*

**Scott Drumm**

*Manager of Research & Strategic*

*Analysis Dept.*

Port of Portland, Portland, Oregon

**Charlie Howard**

*Director of Integrated Planning*

Puget Sound Regional Council

(PSRC)

**Wayne Kittelson**

*Principal*

Kittelson & Associates, Inc.



**Edward Mantey**

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

**Carolyn Morehouse**

*Chief of Research, Development and Technology Transfer*  
Alaska Department of Transportation and Public Facilities

**Ned Parrish**

*Research Program Manager*  
Idaho Transportation Department (ITD)

**Jerry Whitehead**

*Chairman*

Idaho Transportation Board



# STUDENT CONFERENCE



## October 18, 2014

On Saturday, October 18th, transportation students assembled at the University of Washington for the Region 10 Student Conference. Jointly sponsored by PacTrans and the UW student chapter of the Institute of Transportation Engineers, students from Region 10 (Alaska, Idaho, Oregon, and Washington) learned about new transportation research occurring in the Pacific Northwest and how to prepare for success in the professional world of transportation engineering.



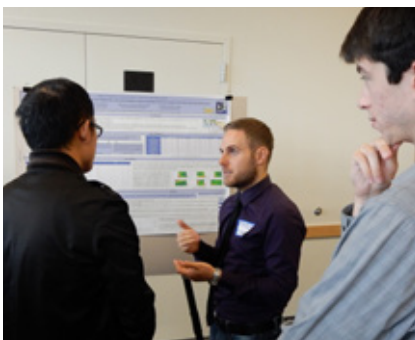
Wayne Kittelson, the Founding Principal of Kittelson & Associates and member of the PacTrans External Advisory Board, delivered the keynote speech on career opportunities in engineering. Kittelson explained that there are many factors to consider when selecting a career pathway, including the work environment and whether it is private or public. While compensation is an important consideration, individuals should weigh whether their core values are a good match with those of the potential organization. Also important to look for in an organization is one that encourages employee growth and development, maintains an open communication environment, and provides a network of mentors and resources, all the while challenging staff with a variety of experiences. Kittelson left students with this charge: "Don't let the boundaries of the organization you work in become the boundaries of your profession."

Mark Hallenbeck, Director of the Washington State Transportation

Center (TRAC), led an engaging session on successful communication in engineering and planning. We all have different styles of communication and speaking, Hallenbeck explained; where communication really comes into play is convincing the client that you are uniquely suited to the job. Hallenbeck also emphasized that no matter how good your work is, if you can't communicate it, people will not value it. Students came away from the presentation with practical speaking tips and an understanding of how to appropriately target their communication to the audience.



The poster session gave students the opportunity to share their research and learn from each other. The diverse topics ranged from social media use after natural disasters to engineering intersection to prevent right-hook crashes at intersections.



The final session of the day brought two industry representatives, Carmen Kwan of Fehr and Peers and Tom Le of DKS Associates, to answer questions from students about their experience in the workforce. Le and Kwan gave useful advice and insight into how they broadened their skill set, how they approached the job search, and what can set a job candidate apart from others.

(L-R) Jennifer Warner, Ruimin Ke, and Xiangyang Guan pose with their winnings from the student poster competition.

