



2021

OKLAHOMA TRANSPORTATION RESEARCH DAY

Transportation Excellence
Through Research
and Implementation

Tuesday, October 19

National Cowboy and Western Heritage Museum
1700 NE 63rd St,
Oklahoma City, OK 73111

Hosted by



SOUTHERN PLAINS
TRANSPORTATION CENTER



OKLAHOMA
Transportation



ACCELERATED BRIDGE CONSTRUCTION
UNIVERSITY TRANSPORTATION CENTER

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PROGRAM

- 7:30 a.m. **Registration and Breakfast**
- 8:30 a.m. **Welcome and Opening Remarks**
Moderator: Rick Johnson, Director of Capital Programs, Oklahoma Transportation
- Tim Gatz, Oklahoma Secretary of Transportation
- 8:45 a.m. **Keynote Lectures**
Moderator: Rick Johnson, Director of Capital Programs, Oklahoma Transportation
- The NCHRP – What it Means For You**
Chris Hedges, National Cooperative Highway Research Program
- Opportunities: Participating in ACRP**
Marci Greenberger, Airport Cooperative Research Program
- 9:45 a.m. **Networking Break and Poster and Demo Viewing**
- 10:15 a.m. **Technical Session One**
Moderator: Dominique Pittenger, University of Oklahoma
- Building Information Modeling for Transportation Infrastructure: Challenges and Opportunities**
Adeeba Raheem, University of Texas at El Paso
- Methodologies for Estimation of Construction Contingencies in the Early Stage of Highway Project Development**
Nils Gransberg, Gransberg & Associates, Inc.
- Diverging Diamond Interchange Success**
Brent Almquist and Michael Sharkness, Oklahoma Transportation
- Aviation and Aerospace Workforce: How Drone Use Can Launch Us Into The Next Decade**
Grayson Ardies, Oklahoma Aeronautics Commission
- Pavement Structure Evaluation with Traffic Speed Deflection Devices**
Deb Mishra, Oklahoma State University
- 12:00 p.m. **Lunch and Poster and Demo Viewing**
- 1:15 p.m. **Technical Session Two**
Moderator: Kelvin Wang, Regents Professor of Civil Engineering, Oklahoma State University
- Thinking Beyond Incremental Advances in Pavement Science and Engineering**
Amit Bhasin, University of Texas at Austin
- Lessons Learned from Forensic Investigations of Pavements in Oklahoma**
Kenneth Hobson, University of Oklahoma
- Oklahoma Rocks! A Geologic Perspective of Oklahoma**
Ben Rojas, Oklahoma Transportation
- Integration of Construction Practice and Weather into Freeze Thaw**
Tyler Ley, Oklahoma State University
- 2:45 p.m. **Networking Break and Poster and Demo Viewing**
- 3:15 p.m. **Poster Awards Ceremony and Video Presentation of Winning Posters**
Moderators: Rick Johnson, Director of Capital Programs, Oklahoma Transportation, and Waseem Fazal, Federal Highway Administration, Chair of Poster Review Committee
- 3:45 p.m. **Closing Remarks**
Rick Johnson, Director of Capital Programs, Oklahoma Transportation and Musharraf Zaman, Director, Southern Plains Transportation Center

KEYNOTE SPEAKERS



Chris Hedges is the director of cooperative research programs at Transportation Research Board—this division includes NCHRP as well as programs in transit, airports, and behavioral traffic safety, with a total annual research budget in excess of \$65 million. Hedges has more than

30 years of experience in managing transportation research programs and projects. He started with TRB in 1999 as a senior program officer and served as manager of the NCHRP for 2.5 years before being appointed as director in 2016. In 2019, Chris led a business process review to select, acquire and implement new project and portfolio management software that facilitated the transition from paper-based procedures to fully digital operations. Before coming to TRB, Hedges was the director of research and information services for the Transportation Association of Canada in Ottawa, Ontario.



Marci Greenberger is manager of the Airport Cooperative Research Program for the Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine. ACRP seeks to identify solutions for airport operators on a wide range of issues,

including operations, maintenance, safety and security. Prior to joining ACRP, Greenberger spent over 18 years in operations and senior management positions at airports in Rhode Island, Indiana, and California. Greenberger is an accredited airport executive by the American Association of Airport Executives, holds a masters in business administration from California State University-Northridge, and earned a bachelor of science degree in aviation management from the Ohio State University.

SPEAKERS AND MODERATORS



Brent Almquist received his bachelor of science degree from Kansas State University in December 1982. Almquist started working for the Oklahoma Department of Transportation in June 1983 at the Altus Residency and was part of the team that added a parallel lane to US-62 East of Altus to the Kiowa/Comanche

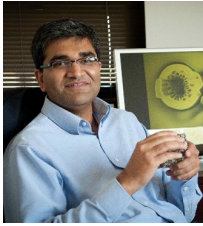
County Line. In 1987, he was transferred to the Clinton Residency. In 1989, Almquist became the assistant resident engineer. In 1991, he was transferred to the District Five Headquarters at Clinton where worked his way to become the area maintenance engineer, then the assistant division engineer, and later in 1997 the division engineer. While working there, Almquist assisted with auditing, completed construction projects and oversaw the maintenance and construction for 11 counties and 104 miles of 1-40 in southwest Oklahoma and the budgeting for the field division. Almquist oversaw construction of many bridges including those over the Canadian River, the Red River, and the Washita River. He also oversaw roadway projects along the 1-40 Corridor, the US-270 Corridor, the US-183 Corridor, and the SH-6 Corridor. Almquist assisted Will Snipes, the District Five construction engineer, on the Diverging Diamond Interchange on 1-40: Exit 38 at Elk City, which was the first interchange of this type to be constructed in Oklahoma.



Grayson Ardies has been the Oklahoma State director of aeronautics since November 2020. Ardies began working for the commission in 2009 as an intern. In 2016, he became manager of the Airport Division and was deputy director from January 2019 through October 2020. Ardies was unanimously selected by the

seven-member commission to fill the state director of aeronautics position, beginning November 2020. He has led many statewide agency initiatives, including a three-year effort working with the state legislature on the protection of military training airspace. He also managed a two-year project involving economic impact of Aerospace and Aviation which established the industry as the second largest economic engine in the state. Ardies was awarded the honorable 2020 State

Aviation Distinguished Service Award from the National Association of State Aviation Officials. He was also listed in the Power 15 List in Aviation and Aeronautics in Oklahoma by the Journal Record in 2020. Ardies graduated from the University of Oklahoma with a degree in aviation management with double minors in business administration and air traffic control. As part of his education through the aviation program, he also received a commercial pilot's license with single and multi-engine instrument ratings and is a certified flight instructor.



Amit Bhasin is a professor of civil engineering and director of the Center for Transportation Research at the University of Texas at Austin. His research and teaching interests are in the area of infrastructure materials. He performs research that relates fundamental properties of constituent materials to the engineering performance of

composites, such as asphalt concrete mixtures. Bhasin has led several research projects sponsored by state and federal agencies including the Texas Department of Transportation, National Cooperative Highway Research Program, Federal Highway Administration, National Science Foundation, and others. Bhasin is actively involved in several national and international organizations and committees pertaining to research in the area of pavements and materials. His research and teaching have been recognized through several awards and honors including the National Science Foundation CAREER award, the CUTC-ARTBA award for outstanding contributions to research and teaching in transportation, and the University of Texas System Regents outstanding teaching award, The University of Texas at Austin's Presidents Associates teaching award and the American Society for Civil Engineers Walter L. Huber Research Prize.



Tim J. Gatz was appointed as the secretary of transportation by Governor Kevin Stitt in early 2019. The Oklahoma Transportation Commission named him Oklahoma Department of Transportation executive director, effective April 1, 2019. Prior to assuming these roles, he served as the executive director of the Oklahoma

Turnpike Authority for three years. Previously Gatz served ODOT for more than two decades in various capacities including serving as deputy director from 2013 to 2016 and as division manager of the Project Management Division where he was instrumental to the development of ODOT's Eight-Year Construction Work Plan. He also served as the director of capital programs and information management where he led the department's coordination with county governments. Gatz earned his bachelor's degree in landscape architecture from Oklahoma State University in 1989 and is a registered professional landscape architect. He has received several honors including the Governor's Public Service Award and the Federal Highway Administration's Partners In Quality Award. He is a member of the American Association of State Highway and Transportation Officials and the American Society of Landscape Architects.



Nils Gransberg is the vice president of Gransberg & Associates, Inc., an international construction engineering and management consulting firm. He also teaches project management courses in OU's Gallogly College of Engineering and in the Construction Science Department, ASCE's Construction

Engineering Certificate program, and courses in alternative project delivery methods for private and public clients. He received his B.S. in construction science from the University of Oklahoma and his M.S. in geological engineering from the Missouri School of Science & Technology at Rolla. Gransberg is currently pursuing a Ph.D. in general engineering at the University of Oklahoma. He is a retired U.S. Army Corps of Engineers officer and has worked in the transportation, commercial, and oil and gas construction sectors. He lives in Lexington, Oklahoma with his wife Scarlett and daughters Kaitlynn and Annabelle.



Kenneth Hobson started his career at ODOT as an asphalt plant inspector in 1984. Later he served as an ODOT asphalt mix design technician. After obtaining his second degree, a bachelor of science in civil engineering from the University of Oklahoma, he helped ODOT implement the performance graded binder

testing protocols. Hobson was certified as an asphalt binder technician by the Asphalt Institute, through their National Binder Technician Certification program. He served as ODOT's bituminous branch manager until his retirement at the end of 2015. He currently manages the two asphalt laboratories at OU: Broce Laboratory and Asphalt Binders Laboratory. Hobson has conducted many asphalt pavement forensic investigations while working at ODOT and OU and has co-authored several peer-reviewed journal papers along with the members of his team at OU. He is a licensed professional engineer in Oklahoma.



Rick Johnson became the Oklahoma Transportation's director of capital programs in July 2019. Johnson began his career with the agency in 1997 as a transportation CADD specialist in roadway design. In 2001, he moved to the special projects branch of roadway design/project management division, eventually

becoming the District Eight project manager in 2010. Beginning in 2014, Johnson established and oversaw the facilities management division. His most recent position was the project management division manager from 2016 until 2019. During his tenure with ODOT, Johnson served as project manager for several notable projects: the reconstruction of the Tulsa Metropolitan Area I-244 TIGER Grant, Oklahoma's first multi-modal bridge crossing to accommodate highway, high-speed intercity and commuter rail, pedestrian, and bicycle traffic, as well as Oklahoma's first fully accelerated bridge construction project on SH-51 over Cottonwood Creek. Johnson earned his bachelor of science in business administration and his master's degree in business management, both from Southern Nazarene University. He and his wife, Cindy, have three sons and live in Yukon.



Tyler Ley has more than 20 years of experience in the fields of structural and concrete materials engineering. During this time, he has worked as an engineer with a design consultant, construction contractor, government agency, and as a professor. Some of the awards that he has received include: the Halliburton Excellent

Young Teaching Award in 2011, the Williams Foundation Professor in 2013 for the College of Engineering, the ACI Walter P. Moore Faculty Achievement Award in 2014, the Researcher of the Year Award from the College of Engineering in 2014, Halliburton Excellent Young Professor in 2014, the OSU Regents Research Award in 2014, and the ACPA Martin J. Knutson Award in 2017. Ley was named the outstanding professor at a research university by the Oklahoma Foundation of Excellence in 2018. He was named one of the most influential people in the concrete industry by Concrete Construction Magazine in 2019. Ley is very active in the American Concrete Institute where he is a voting member of the Concrete Durability, Material Science, Concrete Proportioning, and Sustainability Technical committees.



Debakanta (Deb) Mishra is an associate professor in the School of Civil and Environmental Engineering at Oklahoma State University, where he teaches courses in the areas of geotechnical engineering, pavement engineering, and railroad engineering. Mishra joined OSU in August 2019 after

spending five years as an assistant professor in the civil engineering department at Boise State University. Prior to that, he completed his Ph.D. and post-doctoral work at the University of Illinois at Urbana-Champaign. Deb's research interests are in the areas of (1) advanced laboratory characterization of pavement materials; (2) instrumentation, performance monitoring, and numerical modeling of civil engineering infrastructure; and (3) application of machine learning and artificial intelligence for network-level pavement/railroad condition assessment. He serves as an active member of several TRB and ASCE committees. He has been the chair of the TRB's Unbound Granular Material Sub-Committee since 2016.



Dominique Pittenger received her Ph.D. from the OU Gallogly College of Engineering in General Engineering in 2012 with a focus on civil engineering and construction. Her industry experience of more than ten years and academic experience include heavy civil project delivery, material design, cost framework

development and process improvement. Pittenger also serves as the technical director for the Southern Plains Transportation Center and Faculty Advisor of Transportation Leadership Council-OU Chapter. She serves on various committees and provides research services for programs within the National Academy of Sciences/Engineering through the Transportation Research Board. For the past 10 years, she has taught classes, conducted research and mentored students in local, national and international engineering programs.



Abeeda Raheem received her Ph.D. in construction management from the University of Florida. She holds multiple master's degrees in building construction, environmental engineering, and civil engineering from UF. She is serving as an assistant professor and director of the Construction Safety program at the University of

Texas, El Paso. Raheem is also an invited member of the President's Advisory Committee on Sustainability. She has received more than \$2.5 million in research funding various federal agencies such as the U.S. Department of Labor, U.S. Department of State, National Science Foundation, and Federal Highway Administration. Her research interests include sustainable cities, construction safety, and construction management. Raheem has received several prestigious national and regional awards including the 2016 ASCE Excellence in Civil Engineering Education Fellowship, 2020 UTEP College of Engineering Award for Teaching Excellence, 2020 Society of Hispanic Professional Engineers STAR Award for Educator of the Year, and 2021 American Society of Engineering Education-GSW section Award for Outstanding Young Faculty. She is an Envision™ Sustainability Professional, a certified associate member of the Design-Build Institute of America (Assoc. DBIA™) and an OSHA Certified Master Trainer.



Ben Rojas is the materials division geologist for Oklahoma Transportation. After receiving his bachelor's degree in geology from the University of Arizona in Tucson, AZ, Ben proceeded to work in the mining industry for mining giant Freeport-McMoRan in Green Valley, AZ. He served there as the mine geologist from

2010 to 2012 where he performed mapping, geological interpretation, ore control, and core logging. He then began working for Kleinfelder as a field geologist. In 2014, Ben moved to Tulsa, OK and transferred to the Tulsa-Kleinfelder office where he performed geotechnical, engineering geology and construction materials consulting, focusing on commercial, DOT and Federal work. In 2017, Ben began his career with ODOT as the materials division geologist where he is in charge of all state-wide and out-of-state quarry qualifications, in addition to assisting field operations. Ben is a Tucson, Arizona native who enjoys traveling and seeing new landscapes and of course collecting minerals.



Michael Sharkness is an engineering manager in ODOT's Roadway Design Division. Sharkness is a registered Professional Engineer, currently overseeing the design of projects in District Four. Previously, he oversaw the design of roadway projects in Districts Five and Six. During his time with ODOT, he

has worked on projects of varying sizes and difficulties, from rural bridge replacements on SH-34 in Woodward County to miles long interstate projects on I-40 in Oklahoma County. Originally from Pennsylvania, Sharkness received his degree in civil engineering from the Pennsylvania State University in 2011.



Kelvin Wang is a Regents Professor and Dawson Chair in Transportation Engineering at Oklahoma State University. He received his Ph.D. from Arizona State University in 1992. His research interests focus on automated technologies for pavement survey and pavement data systems for design and

management. In particular, automated cracking survey has been a main thrust of his research in the past 15 years, including developing 3D laser-based imaging sensors, algorithms and computer implementations of database management and image processing of transportation assets, hardware integration and geographical positioning of data. Wang's early work includes optimization and Markovian process for pavement management. In recent years, a primary work conducted by his team includes database support for the MEPDG and DARWin-ME pavement design systems that will become the next-generation of pavement design procedure. Wang recently started working on developing technologies to establish geographically true 3D virtual pavement surface at 1mm resolution that can be used for a variety of analysis on pavements, including distress and profiling surveys and surface characteristics for safety.



Musharraf Zaman holds the Aaron Alexander Professorship in Civil Engineering and Alumni Chair Professorship in Petroleum and Geological Engineering at the University of Oklahoma. He served as the associate dean for research and graduate education, OU Gallogly College of Engineering from July 2005 to December

2013. He is a prolific teacher and a highly accomplished researcher. During his tenure at OU, Zaman has received several prestigious national-level teaching awards from the American Society of Engineering Education. He also received the David Ross Boyd Professorship, the highest life-long teaching award given by OU. Also, he has received over \$30 million in external funding from various state and federal agencies and the industry. He has published more than 390 peer-reviewed journal and conference papers. Several of his papers have won prestigious awards from international societies and organizations. He is a fellow and life member of American Society of Civil Engineers. He served as the editor-in-chief of the International Journal of Geomechanics, ASCE for 11 years and is currently serving as a co-editor. Since October 2013, he has been serving as the director of the Southern Plains Transportation Center.



Work Zone Awareness



I-235/I-44 Interchange Construction



US 65/US 75 Reconstruction

POSTER PRESENTATIONS

1. Test Results of Cyclic Testing on Ductile Precast End-diaphragms of Slab-on-Girder Concrete Bridges

Esteban Villalobos Vega
University of Oklahoma

2. Mapping of State Transportation Agencies Practices and Perceptions about Project Bundling

Saurav Shrestha, Yongwei Shan, and Paul M. Goodrum
Oklahoma State University

3. Novel Data Analysis Methods for Bridge Condition Assessment

Jin-Song Pei, Royce W. Floyd, Dean F. Hougen, Peng F. Tang, John M. Toshima, and Eric C. Mai
University of Oklahoma

4. Prediction of Unconfined Compressive Strength in Oklahoma Clays using Linear Regressions and Random Forest Models

Matias Mendez Larrain, Bryce Hanlon, Talayah Razzaghi, and Musharraf Zaman
University of Oklahoma and Engineering Services and Testing, Inc.

5. Fatigue Crack Propagation in Stiffened Panels Under Random Loading

Ligang Shen, Mohammad Tamimi, and Mohamed Soliman
Oklahoma State University

6. Understanding Phase Separation, Aging Characteristics and SARA Fractions of HDPE, LDPE, and PP Modified Asphalt Binder

S. M. Rahat Rahman, Roksana Hossain, Nazimuddin M. Wasiuddin, and Andrew Peters
Louisiana Tech. University

7. Sensitivity and Reliability Assessment of Eccentric Connections Made with Slip-Critical Bolts and Longitudinal Fillet Welds Using Artificial Neural Networks

Mohammad Tamimi, Omid Khandel, and Mohamed Soliman
Oklahoma State University

8. Performance of Asphalt Mixes Containing Recycled Plastics Incorporated Using the Dry Process and Balanced Mix Design

Sagar Ghos, Christopher R. Sumter, Paul Cancino Arevalo, Syed Ashik Ali, Kenneth R. Hobson, Musharraf Zaman, Greg Kalicki, and Darin Metzger
University of Oklahoma, , Silver Star Construction Company, and Engineering Services and Testing, Inc.

9. Durability and Service Life of Recycled Concrete Aggregate (RCA) for Use in Pavement Base Construction

Paul Cancino, Syed Ashik Ali, Musharraf Zaman, Gregory Scott Garland, and Matt Romero
University of Oklahoma and Oklahoma Transportation

10. Evaluating the Impact of Autonomous Vehicles at a Stillwater Intersection

Chenwei Huang and Joshua Q. Li
Oklahoma State University

11. Structural Monitoring of PC Beams in the SH 4 Bridge over N. Canadian River and Recommendations for Improving Designs

Bruce W. Russell, Alla E. Acheli, and Christopher Filip
Oklahoma State University

12. Analysis of Traffic Speed Deflectometer Data for Evaluating Pavement Condition in Oklahoma

Kaustav Chatterjee, Md. Fazle Rabbi, and Deb Mishra
Oklahoma State University

13. Implementation of Ultra-High Performance Concrete in the Replacement of the Lake Eufaula Spillway Bridge

Omar Yadak and Royce Floyd
University of Oklahoma

14. Data Envelopment Analysis for Highway-Rail Crossing Separation Selection

Xue Helen Yang, Joshua Q. Li, and Wenyaoy Liu
Oklahoma State University

15. Modeling Pavement Quality Index With Pavement Condition Data

Pundit Vorakitolan, David Zheng, and Fazlur Rahman
Oklahoma School of Science and Mathematics

16. Deflection-Based Compaction Control of Open-Graded Aggregate Base/Subbase Courses

Ratul Mondal, Md. Fazle Rabbi, and Deb Mishra
Oklahoma State University

17. Chemical Changes in Plastic Modified Asphalt Binder due to Oxidative and UV Aging

Md. Reazul Islam, Roksana Hossain, Nazimuddin M. Wasiuddin, and Andrew Peters
Louisiana Tech University

18. Long Term Performance and Benefits of Combined BMD and Chemical WMA Technology

Aisan Ranjbar Moshfeghi, Ratul Mondal, Deb Mishra, and Fujie Zhou
Oklahoma State University and Texas A&M University

19. Viscosity of Plastic Modified Asphalt Binder

Charity Durr, Patti J. Hassen, Nazimuddin M. Wasiuddin, and Andrew Peters
Louisiana Tech University

20. Estimating the Low-Temperature Performance Grade of Asphalt Binders using a Simple Surrogate Test

Fariha Rista and Mohamed Elkashef
Oklahoma State University

“Roads remain the essential network of the non-virtual world. They are the infrastructure upon which almost all other infrastructure depends. They are the paths of human endeavor.”

—Ted Conover
Author and journalist



DEMO PRESENTATIONS

Oklahoma Transportation Virtual Library

Michael Molina, University of Oklahoma

Local Technical Assistance Program - LTAP

Gary Snyder, Oklahoma State University

Modeling the Response of Bridge Abutments to Loads Imposed During Construction

Gerald Miller, University of Oklahoma

Roadside Vegetation Management (RVM) and Monarch Butterfly / Pollinator Research

Dennis Martin, Oklahoma State University

Hawkeye Website for Traffic Speed Deflectometer (TSDD) and Portable Light-Weight Deflectometer

Deb Mishra, Oklahoma State University

On-Demand Skid Studies, Grip Tester

Joshua Li, Oklahoma State University

PaveVision 3D 8K, Pavement Scanning System

Kelvin Wang, Oklahoma State University

Phoenix System and the OSU Transportation Pooled Fund Study with Freeze/Thaw Blocks

Tyler Ley, Oklahoma State University

Houston Radar Traffic Data Collection System with SpeedLane Pro Interface

Michael Smith, Oklahoma Transportation

Unmanned Aerial Systems (UAS) for Construction Inspection

Jamey Jacob, Oklahoma State University

Traffic Incident Management (TIM)

Roger Straka, Oklahoma Transportation

POSTER JUDGES

Waseem Fazal

Federal Highway Administration

Walt Peters

Bridge Division, Oklahoma Transportation

Steve Hawks

Hawks Logistics, Inc.

Kevin Suitor

Materials Division, Oklahoma Transportation

Craig Parker

Silver Star Construction Company, Inc.

André Guzmán Rocha

Duit Holdings, Inc.

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