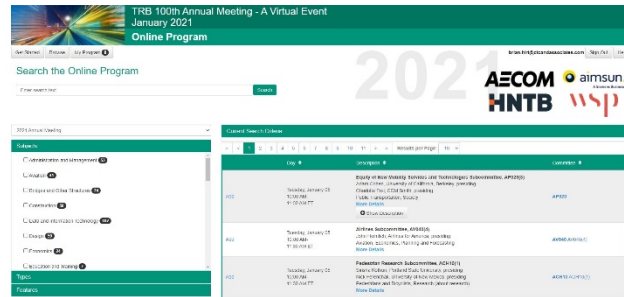# Winter Maintenance at the 2021 TRB Annual Meeting (Virtual Event)

Resource Spotlight: *TRB Annual Meeting Online Portal*

If you're searching for the latest research on a transportation topic, be sure to visit the TRB Annual Meeting Online Program. The program includes papers, posters and presentation materials from the upcoming 2021 Annual Meeting as well as the previous three meetings.

Below we've compiled selected links to the poster, presentations and papers related to winter maintenance to be presented at the 2021 Annual Meeting. **Registration, attendance and access to materials are free for employees of state DOTs and other TRB Sponsor organizations.** Sign in to the Online Program to access all the resources shown here.

If you have trouble accessing this information, check with your DOT or other transportation library. Note that all times listed are Eastern Standard, and all details are subject to change.

Contents

Equipment and Facilities

21-20291 Automating Winter Operations -- the Indiana DOT Smart Plow System (January 25, 1-2:30 p.m. ET)
[Lectern Session](#) with abstract
Jeremy McGuffey
Indiana Department of Transportation

21-01045 Design of Snow-Melting Pavement with Electric Cable Heating System Aiming at Optimum Mechanical and Long-Term Performance (January 27, 10-11:30 a.m. ET)
[Poster Session](#) with abstract
Xingyi Zhu, Qifan Zhang, Tongji University, Zhao Du
Tongji University

21-03772 Effectiveness of Green Warning Lights with Different Flashing Patterns for Winter Maintenance Operations (January 25, 2:30-4 p.m. ET)
[Poster Session](#) with abstract
Fatemeh Fakhrmoosavi, Ramin Saedi, Farish Jazlan, Ali Zockaie, Mehrnaz Ghamami, Timothy Gates, Peter Savolainen
Michigan State University; Purdue University

21-01327 Investigating the Performance of Snowplowable Reflective Pavement Markers in Illinois (January 27, 1-2:30 p.m. ET)
[Poster Session](#) with abstract
Carmine Dwyer, Kelly Morse, Kyle Armstrong
Applied Research Associates, Inc. (ARA); Illinois Department of Transportation

21-20405 Investigating the Performance of Snowplowable Reflective Pavement Markers in Illinois (January 27, 4-5:30 p.m. ET)
[Lectern Session](#)
Carmine Dwyer, Kelly Morse, Kyle Armstrong
Applied Research Associates, Inc. (ARA); Illinois Department of Transportation

21-20087 Iowa DOT Snowplow Optimization (January 27, 2:30-4 p.m. ET)
[Poster Session](#) with abstract
Jing Dong
Iowa State University

Materials

21-20473 Advanced Liquid Deicing in the Contract Maintenance Sector (January 25, 1-2:30 p.m. ET)
[Lectern Session](#) with abstract
Jim Turcan
Cornerstone Partners Horticulture

21-20090 Bio-Based Renewable Additives for Anti-Icing Applications (January 27, 2:30-4 p.m. ET)
Poster Session with abstract
Xianming Shi
Washington State University

21-20292 Deicing Alternatives (January 25, 1-2:30 p.m. ET)
Lectern Session with abstract
Laura Fay
Western Transportation Institute (WTI)

21-20780 Reclaimed Brine for Residential Snow Fighting (January 25, 1-2:30 p.m. ET)
Lectern Session with abstract
Mike Gresch
Steve Brown Apartments

Infrastructure, Pavements and Structures

21-01529 Enhanced Roadside Drainage System for Protection of Salt Vulnerable Areas (January 25, 2:30-4 p.m. ET)
Poster Session with abstract
Sepideh Emami Tabrizi, Arman Amouzadeh, Hani Farghaly, Bahram Gharabaghi
University of Guelph; Government of Ontario Ministry of Transportation

21-03407 Evaluating Costs and Benefits of Snow Fences in Illinois (January 25, 2:30-4 p.m. ET)
Poster Session with abstract
Shambhu Baral, Yan Qi, Pranesh Biswas
Southern Illinois University, Edwardsville

21-21249 Evaluation of Electrically Conductive Asphalt Mixtures for Snow and Ice Removal Applications: An Experimental and a Field Test (January 26, 11:30-1 p.m. ET)
Poster Session
Rahaf Hasan
Rowan University

21-02812 Laboratory Evaluation of Electrically Conductive Asphalt Mixtures for Snow and Ice Removal Applications (January 26, 2:30-4 p.m. ET)
Poster Session with abstract
Rahaf Hasan, Ayman Ali, Christopher Decarlo, Mohamed Elshaer, Yusuf Mehta
Rowan University; U.S. Army Engineer Research and Development Center

Technology, Information Systems and Performance Management

21-20799 Crowd-Sourced Road Friction for Winter Operations
Lectern Session with abstract (January 25, 1-2:30 p.m. ET)
Dan Eriksson
Swedish Transport Administration (TRAFIKVERKET)

21-03300 Evaluating Weather Responsive Freeway Management Strategies of Traveler Information Messages and Snowplow Pre-Positioning in a Connected Vehicle Environment (January 25, 11:30 a.m.-1 p.m. ET)
Poster Session with abstract
Qinhua Jiang, Dong Nian, Yi Guo, Jiaqi Ma
University of California, Los Angeles; University of Cincinnati

21-04250 Integrating Connected Vehicle Data in Road Network Weather Management Systems: Snowplow Routing Application (January 25, 2:30-4 p.m. ET)
Poster Session with abstract
Euhye Kim, Hani Mahmassani
Northwestern University

21-20092 Snow and Ice Control Performance Measurement: Comparing "Grip," Traffic Speed Distributions and Safety Outcomes During Winter Storms (January 27, 2:30-4 p.m. ET)
Poster Session with abstract
James Sullivan, Jonathan Dowds
University of Vermont

Weather and Road Conditions

21-01014 Development and Evaluation of Geostatistical Methods for Estimating Weather-Related Collisions – A Large Scale Case Study (January 27, 1-2:30 p.m. ET)
Poster Session with abstract
Andy Wong, Tae J. Kwon
University of Alberta

21-02321 Effects of Winter Road Surface on Driver's Risk Avoidance Behavior When the Vehicles Are Entering a Curve Operated with Adaptive Cruise Control (January 27, 1-2:30 p.m. ET)
Poster Session with abstract
Naoyuki Shiraishi, Sho Takahashi, Toru Hagiwara, Minoru Okada, Toshiyuki Naito, Kazunori Munehiro
Hokkaido University; Denso Corporation; Docon Co., Ltd.; Civil Engineering Research Institute for Cold Region

21-00464 Spatial Mapping of Winter Road Surface Conditions via Hybrid Geostatistical Techniques
(January 27, 2:30- 4 p.m. ET)
Poster session with abstract
Mingjian Wu, Tae J. Kwon, Liping Fu
University of Alberta; University of Waterloo

21-03463 Weather and Surface Condition Detection Using Road-Side Webcams: Application of Pre-Trained Convolutional Neural Network (January 27, 1-2:30 p.m. ET)
Poster Session with abstract
MD Nasim Khan, Mohamed Ahmed
University of Wyoming

21-03677 Winter Road Surface Conditions Classification Using Convolutional Neural Network (CNN): Visible - Light and Thermal Images Fusion (January 27, 2:30 p.m.-4 p.m. ET)
Poster Session with abstract
Ce Zhang, Ehsan Nateghinia, Luis Miranda-Moreno, Lijun Sun
McGill University