

## Transportation Applications Team

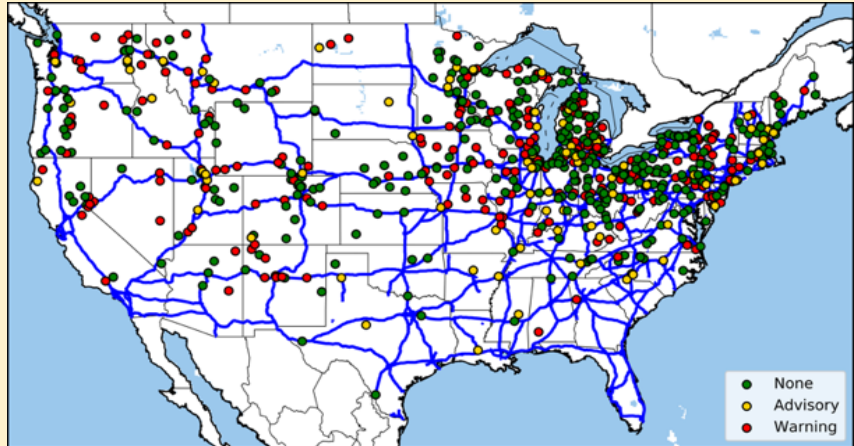
This team focuses on the development of impacts-based decision support tools to help detect and anticipate threats to the transportation sector. We work collaboratively with the National Weather Service (NWS) and the Federal Aviation Administration (FAA) to develop the next generation of products and tools for use within operations, with particular focus on decision support for transportation-related warnings/advisories (e.g., blizzards, aircraft hail encounters, icing, etc). Highlights from ongoing projects are below. We are excited to collaborate on projects that address all phases of transportation including ground, air, and water.

### Team Members

Dr. Heather Reeves  
Dr. Andrew Rosenow  
Daniel Tripp  
Dr. Michael Baldwin  
Adam Werkema



**Dozens of vehicles involved in deadly pileup on Interstate 78**  
— CBS 14 Feb 2016

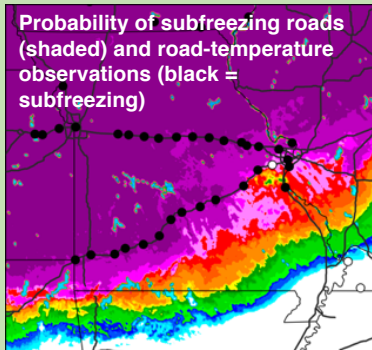


A recent study led by summer undergraduate researcher, Joe Burzdak shows that only 46% of all snow-related fatalities on roads have an NWS advisory or warning. This includes the 36-car pile-up in central PA in Feb 2016 (shown on left). Dr. Dana Tobin is leading a research effort to better understand the nature of how weather contributes to road fatalities.

**2 killed, more than 100 vehicles crash on icy Missouri roads**  
— Associated Press 4 Feb 2018



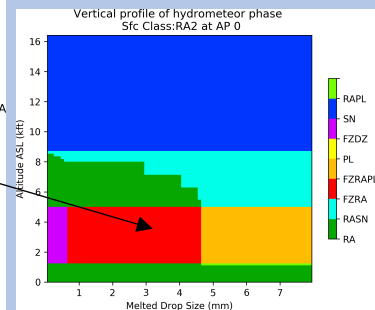
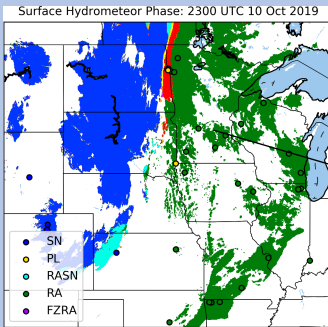
**Probability of subfreezing roads (shaded) and road-temperature observations (black = subfreezing)**



A new tool under development by CIMMS researcher Shawn Handler allows forecasters to anticipate the probability roads are subfreezing and, hence, whether they are likely to accumulate snow/ice or allow for flash freezes, like the one that led to this 24-car pile-up that occurred in central Missouri in February 2018 (left panel). This product is in transition to the WPC's Winter Storm Severity Index and is expected to become operational in 2-3 years.



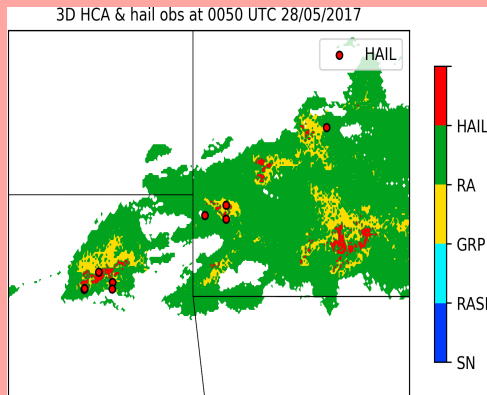
**Saskatchewan plane crash survivor recalls people screaming...**  
 – Globe and Mail 14 Dec 2017



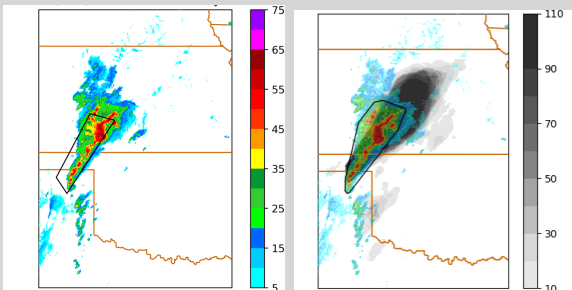
Precipitation type has obvious impacts on road safety, but did you know that the FAA is phasing in new laws that will limit terminal air space activities for certain types of aircraft when freezing drizzle is present? These laws require a more enhanced discrimination of hydrometeor phase than is possible with existing algorithms. Dr. Andrew Rosenow is leading a research effort to transition this algorithm into NWS operations both within the MRMS system as well as for the National Blend of Models. This algorithm includes additional surface categories not available with current algorithms and a full 3D diagnosis of hydrometeor phase across the entire drop-size distribution within terminal airspaces of commercial airports.



**'Scariest flight of my life:' Hail smashes nose of plane that flew into towering storm**  
 – The Washington Post 5 June 2018



While rare, hail encounters by airliners do still occur because it can be very difficult to discern whether hail exists at flight level. Shawn Handler, Heather Reeves, and Maci Gibson are working to extend this algorithm to provide additional capabilities. This algorithm is expected to transition into operations in FY2022.



Example of a convective sigmet as they are currently generated (left) and an automatically-detected sigmet along with the 0-2 h probability of a sigmet (right).

Heather Reeves and Daniel Tripp are collaborating with forecasters at the NWS/Aviation Weather Center and the FAA to transform the way convective sigmets and traffic flow convective forecasts are produced. They are developing artificial intelligence (AI) to automatically detect storms that pose a threat to the safety of flight and to grade these according to their impacts.