



August 27-31, 2023
FLORENCE - ITALY
16th International
Conference on
Wind Engineering



2021 devastating tornadoes in USA

Summary outline

As one of the most violent natural hazards, tornadoes have caused incredible death, injury and property loss. The 2021 Midwest Tornado Outbreak on December 10-11, 2021 is claimed to be the deadliest tornado event that occurred in December in US history. Normally, tornadoes in December are confined to the Gulf Coast region, and tornado outbreaks in areas this north this late in the year are very rare. In this tornado outbreak, a total of 71 tornadoes hit 10 midwestern states, which were Alabama, Ohio, Indiana, Georgia, Missouri, Kentucky, Tennessee, Arkansas, Illinois, and Mississippi. The path of the storm initially started in the northeastern part of Arkansas and traveled northeastern wards through the other states. The severity of these tornadoes ranged from EF0 all the way to EF4, including 4 EF-4, 6 EF-3, 15 EF-2, 28 EF-1, 17 EF-0, and 1 EF-U (unknown). In particular, it includes a family of damaging "Quad-State " tornadoes, with an EF4 tornado that was on the ground for over 160 miles, cross-cutting Arkansas, Missouri, Tennessee and then Kentucky, with Mayfield, KY being the hardest hit. Overall, this tornado outbreak not only caused a projected \$18B of economic loss, including direct damage to homes, businesses and infrastructure, as well as building contents, and indirect losses such as business disruption, lost wages, transportation disruption, displacement and rescue operations, but also claimed the lives of 91 people and injured hundreds of people. The devastation of this tornado outbreak further highlight the need to understand whether destructive tornadoes in winter are relevant to climate change (tornado climatology), to understand tornado-structure interactions, to understand vulnerability of communities, to tornadoes and to develop innovative approaches to mitigate tornado-induced damage, forming the following three topics for consecutive sessions. Some sessions may have two sessions if more abstracts are received.

Organisers & their affiliation:

Grace Yan, Associate Professor of Missouri University of Science and Technology,
Director of Center for Hazard Mitigation and Community Resilience - yang@mst.edu

Horia Hangan, Professor of Ontario Tech University

Canada Research Chair in Adaptive Aerodynamics - horia.hangan@ontariotech.ca