Strengthening Canada's resilience to severe weather

Western University's Canadian Severe Storms Laboratory is leading national efforts to better predict and prepare for high-impact weather events to protect lives, property and communities across Canada.

Western

All in.

Climate change is one of the greatest threats to human health, safety and economic security. Nearly half the world's population, including millions of Canadians, now lives in high-risk climate zones. Severe weather events such as hurricanes, tornadoes, electrical storms, floods, wildfires and droughts have increased more than fivefold in the past 50 years, causing millions of deaths and trillions of dollars in damages worldwide.

With world-class expertise and globally unique experimental infrastructure — including the WindEEE Dome and the Three Little Pigs Project — Western has transformed our understanding of wind engineering, climate risks and disaster mitigation. The Canadian Severe Storms Laboratory (CSSL) builds on this foundation by applying high-resolution data to drive innovation and strengthen Canada's readiness for extreme weather.

The lab brings together leading scientists and pioneering initiatives such as the Northern Tornadoes Project, the Northern Hail Project and the new Northern Mesonet, a regional network of automated weather and environmental monitoring stations designed to track damaging winds, hailstorms and extreme rainfall. Looking ahead, the CSSL plans to launch another project focused on flash floods in Canada.

Together, these programs are building the most detailed storm records ever assembled for tornadoes, hail, derechos, downbursts and flash floods. This data is driving more accurate forecasts, faster emergency responses and smarter long-term planning, with the ultimate goal of helping communities across Canada become better prepared and more resilient in the face of severe weather.

Equally important is CSSL's mission to train the next generation of experts. Through our summer field internship program for undergraduates and high school students, we provide hands-on experience in storm research and foster future leaders in climate science and resilience.

With your support, we can expand our research and education programs to increase our impact and capacity to stay ahead of escalating extreme weather events.

> The Canadian Severe Storms Lab collects vital information, from tracking damage to buildings and key infrastructure to recording weather patterns. This work is essential for creating better designs that can adapt to our changing climate. And it's only possible thanks to the generosity of our donors.
>
> Greg Kopp, ImpactWX Chair in Severe Storms Engineering, Director of the Canadian Severe Storms Laboratory

THE FRONTIERS OF STORM RESEARCH

As part of Western's Canadian Severe Storms Laboratory, these projects not only advance severe weather science but also create opportunities for student learning and research participation.

Flash flood program: CSSL is launching a new initiative to study flash floods, with preliminary work already carried out in the Greater Toronto Area after severe flooding.

Updated Enhanced Fujita (EF) scale: In collaboration with U.S. partners, CSSL is updating the Enhanced Fujita scale used to measure storm damage intensity. Once development is complete, CSSL will adopt the enhanced version in Canada.

Hail damage surveys and universal scale: Through forensic-level surveys of hail impacts, CSSL is developing a universal hail damage scale and using hail that's been collected to improve radar algorithms for detection and size estimation. These advances will underpin a radar-based hail climatology for Canada.

Are you all in? Get in touch.

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