Met Éireann's AI Transformation

Alan Hally, Brendan Butler – Met Éireann's AI Transformation Team (AITT)

AI² Launch – 25th of September, 2025

Business Problem

- Met Éireann monitors, analyses and predicts Ireland's weather, climate and flooding. We do this to provide Irish society with world-class weather, climate, and flood services to protect life and property
- The pace of change in weather, climate and technological advances has introduced significant challenges
- Extreme weather is increasing in frequency and severity, placing greater demand on accurate, hyper-local forecasts and early warnings
- Traditional numerical weather prediction (NWP) models, while scientifically robust, can be computationally intensive
- Citizens and stakeholders now expect personalised, real-time, and actionable weather insights tailored to their specific contexts
- Recognising this, Met Éireann identified a critical gap: There was no structured national academic centre in Ireland to apply AI advances directly to meteorology, flood and climate services

Solution Part 1:
AI Science as a Service

- The solution was to establish **AIMSIR (AI for Meteorological Services, Innovation and Research)**, a joint initiative with University College Dublin (UCD). This centre brings together PhD students, postdoctoral researchers, domain experts, and Met Éireann's meteorologists to deliver citizen-centred AI services.
- To get the programme up and running, Met Éireann:
  - Co-designed PhD and MSc programmes with UCD, ensuring strong scientific and AI foundations
  - Funded the establishment of a Full Professorship role in AI for Weather & Climate – **Professor Andrew Parnell** appointed in November 2024
  - **Initially defined 40+ applied AI research projects**, aligned with national needs and operational relevance from which **approx. 18 will be implemented**
  - Secured dedicated AI infrastructure
  - Committed staff supervisors from across Met Éireann to ensure research translates into real-world operational impact
  - **Target audience/customers**: Irish citizens, emergency managers, farmers, healthcare providers, transport providers, energy operators, and Met Éireann's forecasters themselves

AIMSIR
Centre for Artificial Intelligence in Meteorological Services, Innovation & Research

Infrastructure to Power Innovation @ AIMSIR Centre

- A National AI Weather Lab Built for Experimentation
- Met Éireann has built a **dedicated AI infrastructure stack**:
    - **16x NVIDIA H100 GPUs**, 70TB NVMe, Red Hat OpenShift AI
    - Fully operational by Oct 2025
- This will support:
    - Scalable model training
    - Real-time inference pipelines
    - Containerised MLOps environments
- Designed with **UCD collaboration in mind**: browser access, CI/CD, versioning, and support

Met Éireann AI Strategic Direction

Local Impact, Not Global Competition

Met Éireann isn't trying to outbuild Google DeepMind or ECMWF. We're building on AI advances in meteorology to serve Irish people, sectors, and landscapes

We're focusing on citizen-centred AI projects that translate model output into actionable, local decisions

Example research themes with UCD:

Personalised Alerts: ML systems for day-to-day decision support (commuting, farming, health)

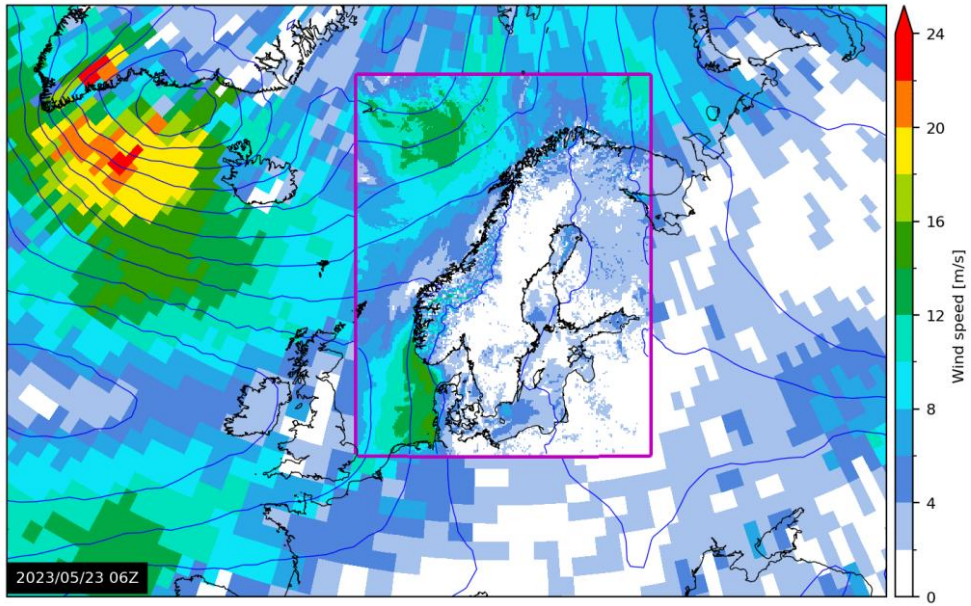
Hospital Impact Forecasting: AI linking weather to psychiatric and general admissions

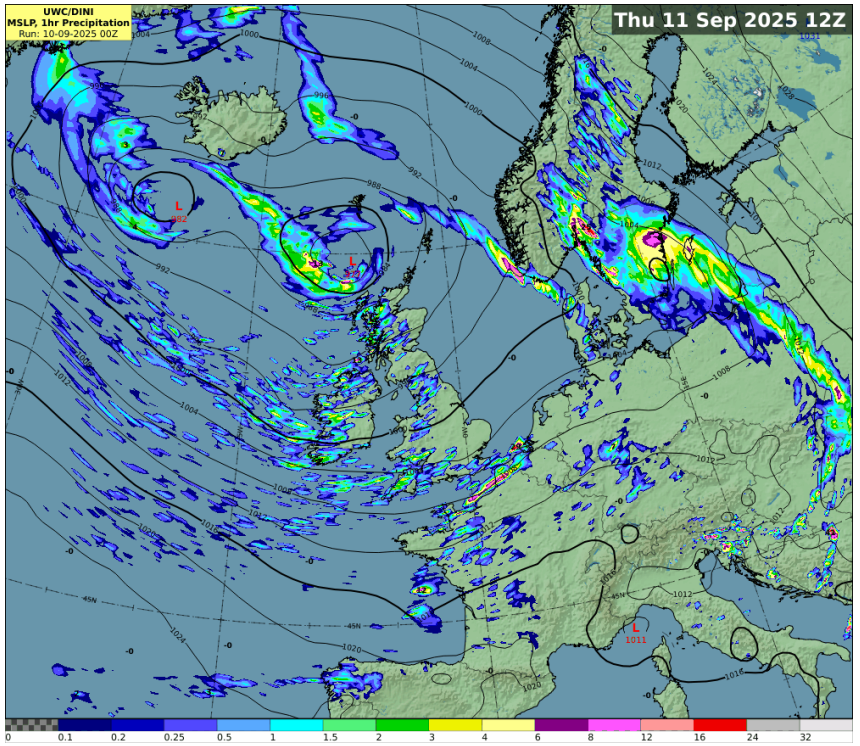
Flood Risk Models: AI for sub-catchment forecasting using satellite and radar data

Nowcasting: Real-time rainfall prediction using earth observation data and neural models

Solution Part 2:
Dedicated AI Weather Modelling Team

- Develop internal expertise in machine learning weather prediction (MLWP) models.
- Construct regional MLWP models over Ireland using both Graph Neural Network and GraphTransformer approaches
- Training these models on decades worth of meteorological data
- Ultimate goal to operationalise a MLWP model in Met Éireann
- This is also a partnership approach/collaborative effort working closely with other National Meteorological Services across Europe





Thank you

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