RRS Summit 2026, Day 2, Track 1: Natural Hazard Preparedness

Imperial College London, 17 September 2026, 09:45 to 12:30.

General information

What this session is for

This working session will together build a practical answer to *how can societies strengthen preparedness for floods, droughts, and extreme heat when the future conditions are deeply uncertain*?

Participants divide into tables, and each table works backwards from a resilience outcome to the specific pathway that would deliver it. By the end of the session, the tables bring their pathways together into a single summary for the track. The workshop is facilitated by the Centre for Active Resilience and Security at Imperial College London, the EIS Council, Kwame Nkrumah University of Science and Technology, and the University of Ghana.

How the day runs

Time	Block	What happens
09:45	**Setting the stage**	Introduction to the session and its method. Four speakers (details provided below) each give a short account of the work they bring to the theme, covering community knowledge and livelihoods, responsible AI and resilient communications, systems-level decision-making under uncertainty, and cross-sector continuity planning.
10:10	**Into tables**	Participants settle into mixed tables of six to eight and introduce themselves. Each table receives one concrete scenario to work on for the rest of the session.
10:15	**The challenge**	The table defines its resilience outcome for 2035, then works backwards. Who is most exposed, which services could fail, what institutional, social, or financial weaknesses increase vulnerability, and which assumptions are least certain. Tables also record what is already working and what would work with more support.
10:45	**The solution**	The table generates options and commits to one pathway, made up of an action that can begin now, an operational or governance change needed to implement it, and a longer-term capability or research need. Options are considered through three lenses, cutting-edge technology, community-centred approaches, and security, and judged on effectiveness, feasibility, equity, and robustness.
11:05	**Break**	Fifteen minutes.

Time	Block	What happens
11:20	**Partners**	The table maps who must work together to deliver its pathway and assigns the roles of lead, owner, operator, knowledge partner, and funding partner, along with the means by which affected communities can participate in and challenge decisions.
11:50	**Funding and ownership**	The table builds a plausible funding and ownership model, distinguishing initial investment from ongoing operating costs, and setting out who receives the benefits, who bears the risk, and who owns the resulting technology, data, or infrastructure.
12:15	**Report back**	Each table summarises its work. A selection of tables present in full, and the facilitators draw the threads together into the session output.

Table topics

- **Anticipation and warning.**
  Example: Wildfire during a prolonged heat and drought period, with fire weather conditions forecast three to five days ahead but ignition location and spread direction unknown until hours before impact.
- **Continuity during the event.**
  Example: Multi-day power outage during extreme heat.
- **Recovery and reconstruction.**
  Example: A farming district after a major flood, where reconstruction funds must be allocated across competing priorities.
- **Slow-onset adaptation with no event to trigger action.**
  Example: Drying trend and rising heat with no single disaster to mobilise attention, with the viable crop mix shifting within a generation.

Speakers

Ji-Eun Byun (Centre for Active Resilience and Security (CARS), Imperial College London)

Title: Forecasting and enhancing system-level resilience of infrastructure networks

Abstract: Infrastructure networks deliver their service through many interacting components, such as tracks, stations, and rolling stock in a rail network, or generators, substations, and transmission lines in an energy grid. As these networks grow more complex and more interdependent, their system-level performance becomes harder to forecast and harder to maintain. Disrupted rail services already cost the UK and Germany hundreds of millions of pounds each year. Changing hazard conditions are compounding the problem, exemplified by European heatwaves now affecting assets that were designed for a different climate. Meeting this needs a new class of technology that can forecast and optimise system performance under uncertainty, together with data systems that capture how networks actually perform and how threats are shifting. It also needs coordinated operation and maintenance across organisational boundaries, since decision authority and asset ownership are rarely held by the same body.

Specification

Hazard(s): Wide range, from earthquakes, floods, and heat waves to asset deterioration

System(s): Infrastructure networks such as transport and energy grid

Community(ies): Infrastructure operators and emergency management workforce

Technology(ies): Probabilistic AI and data collection and analytics

Decision(s): Coordinated system operation and maintenance

Bottleneck(s): Technology, data availability, and operational complexity

Dr Ronen Hoffman (EIS Council)

Title: Black Sky hazards and cross-sector continuity planning for catastrophic infrastructure failure

Abstract: Modern infrastructure sectors have become so interdependent that no single one can be restored in isolation. A long-duration, wide-area power outage, whether triggered by natural hazard, cyberattack, or electromagnetic disturbance, rapidly disables water, fuel, communications, healthcare, and finance, and each of those is in turn needed to bring the grid back. EIS Council approaches that deadlock through sector-by-sector and cross-sector resilience planning, published playbooks and standards, international summits, and large-scale multi-sector exercises that test restoration plans against realistic failure conditions. What comes out of that work is a set of measures governments, utilities, and communities can take now to shorten recovery from events that fall outside conventional emergency planning assumptions.

Specification

Hazard(s): Black Sky events, including severe weather, wildfire, earthquake, cyberattack, and electromagnetic disturbance

System(s): Electric power grids and the dependent lifeline sectors of water, fuel, communications, healthcare, transport, and finance

Community(ies): Infrastructure operators and emergency management workforce

Technology(ies): Restoration playbooks and standards, resilient backup communications, and multi-sector exercise and simulation platforms

Decision(s): Cross-sector restoration prioritisation, mutual assistance and public-private coordination, and national preparedness investment

Bottleneck(s): Circular interdependence between sectors, fragmented ownership and authority, planning assumptions that stop short of catastrophic durations, and underinvestment in low-probability scenarios

Prof Jerry John Kponyo (Responsible AI Lab, KNUST)

Title: Responsible Artificial Intelligence and resilient communications for disaster preparedness

Abstract: Responsible Artificial Intelligence offers a route to building resilience in vulnerable communities during natural disasters such as floods, droughts, and extreme heat. Realising it depends on technologies that function effectively without reliable internet access or a continuous power supply, and on secure communication networks that respect local languages and cultural contexts. These requirements set the terms for ensuring that communities historically excluded from technological advancement are actively protected and served during climate emergencies.

Specification

Hazard(s): Floods, droughts, and extreme heat

System(s): Communication networks, power infrastructure, and artificial intelligence systems

Community(ies): Rural populations, vulnerable groups, and communities historically excluded from technological development

Technology(ies): Responsible Artificial Intelligence, offline capable communication tools, and secure network infrastructure

Decision(s): Designing inclusive technology interventions, maintaining essential communications during power failures, and integrating local languages into artificial intelligence solutions

Bottleneck(s): Unreliable internet connectivity, frequent power outages, language barriers, and a lack of inclusive technological design

Prof Joseph Awetori Yaro (University of Ghana)

Title: Livelihoods, land, and adaptive capacity in rural communities facing climate extremes

Abstract: Preparedness is shaped as much by social structures as by physical assets. In rural Ghana, exposure to drought, flooding, and heat is mediated by land tenure arrangements, migration patterns, market access, and the commercialisation of agriculture, all of which determine who can absorb a shock and who cannot. This talk draws on long-term fieldwork with farming and pastoral communities to show how adaptive capacity is distributed unevenly within apparently homogeneous populations, and how interventions designed without that understanding can deepen the vulnerabilities they intend to reduce. It argues for co-designing preparedness measures with communities, and for treating local knowledge and institutional arrangements as part of the system being modelled rather than as context around it.

Specification

Hazard(s): Droughts, floods, extreme heat, and slow-onset climate change

System(s): Agricultural and food systems, land tenure and governance institutions, and rural livelihood networks

Community(ies): Smallholder farmers, pastoralists, migrants, and marginalised rural populations in West Africa

Technology(ies): Participatory and co-design methods, social vulnerability assessment, and community-based fieldwork

Decision(s): Targeting of adaptation support, land and agricultural policy, and the design of equitable preparedness interventions

Bottleneck(s): Unequal access to land and resources, weak local institutions, limited social protection, and interventions that ignore local context