**INTERNATIONAL**

# INVITED SESSION SUMMARY

**Title of Session:**
**The White, The Grey and The Black Approaches in Simulations**

**Name, Title and Affiliation of Chair:**
Dr Masoud Sajjadian
Edinburgh Napier University, UK

**Details of Session (including aim and scope):**

In November 2022, World population exceeded 8 billion and the most recent report from Intergovernmental Panel on Climate Change (IPCC) states in 2019, atmospheric $CO_2$ concentrations were higher than ever before in at least the last 2 million years. The report also emphasizes it is almost certain human-made $CO_2$ emissions are the main cause of global warming and many more concerns in our planet.

Now is the time to make serious and effective actions to mitigate the risks and reduce emissions as much as possible. The role of buildings in carbon emissions worldwide is well documented and so research focus on building performance simulations, quantification of emissions and effective decisions should increase. This session endeavours to invite researchers to present their findings and share their knowledge in building performance simulation area to help the research community address our environmental challenges through better design decision making and optimisation methods of building performance.

Simulation is known as the "third-way" of doing science (like deduction it starts with assumptions and unlike induction it does not necessarily prove or disprove theorems but It generates data that can be analyzed inductively) and depending on the balance between theoretical modelling and experimental (machine learning) modelling the approaches can be categorised from white (fully theoretical) to grey and black (mostly experimental).

There is an urgent need for a collective effort from different disciplines to investigate the capacity of simulation and the future performance of buildings under a changing climate. This session aims to disseminate research works about the impact of climate-aware simulation with all the relevant approaches and their role to improve building performance. A wide range of disciplines is invited to contribute to this session from environmental science to engineering, architecture and architectural technology fields.

Original papers in the followings areas are welcome:

- Empowering building simulation tools with Artificial Intelligence and Machine Learning Methods
- Energy and comfort simulations and the role of cutting edge tools in informing design decision making
- Quantification of overheating and overcooling risks in buildings
- Simulation and performance evaluation of small scale and integrated renewable energy systems
- Effective and zero emission ventilation strategies with support of CFD modelling
- Design solutions for extreme climates
- Simulation in education
- Standards and sustainability programs assessment with simulation tools (Passivhaus, Energiesprong, BREEAM, etc.)

**Main Contributing Researchers / Research Centres (tentative, if known at this stage):**

**Website URL of Call for Papers (if any):**

**Email & Contact Details:**

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