



## **A Toolkit of Systems Gaming Techniques**

David Finnigan (1) and Jamie W McCaughey (2,3)

(1) Earth Observatory of Singapore, Nanyang Technological University, Singapore (jmccaughey@ntu.edu.sg), (2) Institute for Environmental Decisions, ETH Zürich, Switzerland, (3) Boho Interactive, Australia

Decision-makers facing natural hazard crises need a broad set of cognitive tools to help them grapple with complexity. Systems gaming can act as a kind of 'flight simulator for decision making' enabling us to step through real life complex scenarios of the kind that beset us in natural disaster situations. Australian science-theatre ensemble Boho Interactive is collaborating with the Earth Observatory Singapore to develop an in-person systems game modelling an unfolding natural hazard crisis (volcanic unrest or an approaching typhoon) impacting an Asian city. Through a combination of interactive mechanisms drawn from boardgaming and participatory theatre, players will make decisions and assign resources in response to the unfolding crisis.

In this performance, David Finnigan from Boho will illustrate some of the participatory techniques that Boho use to illustrate key concepts from complex systems science. These activities are part of a toolkit which can be adapted to fit a range of different contexts and scenarios. In this session, David will present short activities that demonstrate a range of systems principles including common-pool resource challenges (the Tragedy of the Commons), interconnectivity, unintended consequences, tipping points and phase transitions, and resilience. The interactive mechanisms for these games are all deliberately lo-fi rather than digital, for three reasons. First, the experience of a tactile, hands-on game is more immediate and engaging. It brings the focus of the participants into the room and facilitates engagement with the concepts and with each other, rather than with individual devices. Second, the mechanics of the game are laid bare. This is a valuable way to illustrate that complex systems are all around us, and are not merely the domain of hi-tech systems. Finally, these games can be used in a wide variety of contexts by removing computer hardware requirements and instead using materials and resources that are easily found in classrooms, meeting rooms and community spaces globally.

We discuss further our application of these techniques to natural hazard crises in our presentation 'Using systems gaming to explore decision-making under uncertainty in natural hazard crises' in the companion EGU session EOS10: 'Scientists, artists, and the Earth: co-operating for better planet sustainability'.