Summary of General Network Discussion Meeting: November 30th, 2012

University of Warwick

Item 1. *Administrative issues*: B. Hnat explained how to claim travel expenses for the meeting. This information is now on the web pages under the link Travel Claims.

Item 2. *Introduction talks from various groups*

A. Antonio Politi, Institute for Complex Systems and Mathematical Biology, Aberdeen.
B. Bernard Piette, University of Durham
C. Sandra Chapman, Centre for Fusion, Space and Astrophysics, University of Warwick
D. Richard Blythe, University of Edinburgh
E. Matthew Turner, System Biology & Complexity, University of Warwick
F. Tomislav Stankovski, Nonlinear and Biomedical Physics, University of Lancaster
G. Mytia Pushkin, Soft Matter, University of Oxford
H. Matthias Eschrig, Condensed Matter, Royal Holloway
I. Tim Evans, Imperial Collage
J. Peter Sollich, KCL

Item 3: *Summary of small group discussions*

Group A. Emergence of structures and patterns: The discussion focused on different realisations of emergence. Topics that were covered included: long range events, emergence as mathematical concept (solution of certain equations). A need for theoretical approaches beyond linear stability was noted (large deviation theory). On the experimental side the need for generic structure detection schemes were pointed out. There was a brief discussion of similarities/differences between emergence in classical and quantum systems, with the conclusion that quantum physics adds another level of difficulty to this already challenging problem.

Group B. Dynamics of large-scale failure: The group started their discussion with an attempt to understand what we mean by "system far from equilibrium". As one may suspect, we did not get far and concluded that it could be beneficial if we actually had a similar discussion but driven by physical challenges that emerge in different areas of physics once non-equilibrium dynamics has to be considered. Such discussion should be illustrated by examples of physical systems.

Group C. Response to strong driving and shocks: The discussion initially focused on the measure of driving strength – what is and is not a "strong" driving. The emphasis was on the tools that exist, but are scattered in different areas and the need to bring these together. We were urged to bring more focus into these topics, not concentrate on the generic questions.

Item 4: B. Hnat discussed the funding of small pilot projects and the general ideas behind different network activities. It has been agreed that one of the first workshops should be on a generic technique of Large Deviations.