Complex engineered networks are a pervasive feature of modern society. Examples include transportation systems (road, rail, and airlines), electric power grids, cellular grids, and the internet.

These distributed network systems with many interconnected components provide critical services for everyday life, such as water, food, energy, transport, communication, banking, and finance. Moreover, most of these critical infrastructures are interconnected and interact with and depend on social networks. As a result of technological progress and worldwide urbanization and globalization processes, the dependence of our society on these complex systems spanning cities, countries, and even continents, constantly grows.

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Given the critical role that engineered networks play in the functioning of our societies, there is an increasing demand for these systems to be highly reliable. A deep understanding of their actual capabilities to withstand natural hazard, such as earthquakes, tsunamis and hurricanes, and man-made threats, e.g. accidents and terrorism, is crucial. The related issues of resilient network design and operation are also closely related to sustainability problems which are of increasing importance today. In particular, the degree to which a technological network subjected to internal or external stresses (e.g. cascading failures or seismic hazards) is capable of keeping (or recovering) the service demanded needs to be quantitatively estimated. A failure of a critical infrastructure to provide the required service could lead to a range of serious consequences for business, government and the community. In this respect, cascading failures, where external perturbations trigger some initial local failures that lead to eventual global network failure, are especially hazardous.

Quantitative assessment of network reliability and associated risks and uncertainties is therefore a key aspect of system design, optimization, and operation.
This special issue is aimed at providing a venue for leading experts, researchers, academics and practicing engineers working in the interdisciplinary area of complex engineered networks to present the latest developments in the field and set the state of the art.

Contributions addressing the following topics are especially welcome:

Reliability, risk, and uncertainty in complex engineered networks and systems.
Vulnerability and resilience analyses of critical infrastructures.
Modelling of technological networks and uncertainty quantification
Statistical properties of lifelines and processes on the networks.
Avalanches, cascading failures and extreme events.
Resilient network design and maintenance strategies
Robustness of networks of networks and multiplexes

Submissions for this special issue are due by September 15, 2016.

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