

Stimulating Interdisciplinary Collaboration

NEHRP needs to encourage interdisciplinary research in addition to the much more common disciplinary research. Interdisciplinary research is needed because the societal assets at risk are sociotechnical systems. The social component is defined by social networks as diverse as economic production chains and markets, intergovernmental systems, and friendship networks. These social networks are interlinked with the structures in which people live and work and the systems (water, sewer, electric power, fuel, telecommunications and transportation) that provide the physical infrastructure supporting the social system. Disciplinary research can contribute some important components of earthquake hazard mitigation such as how to design more seismically resistant structures. However, interdisciplinary research is needed to address the interconnections among components at the systems level such as how much residual risk is acceptable for different uses (e.g., industrial buildings, residences, schools, and hospitals).

Interdisciplinary research is uncommon because of cognitive and social obstacles. Effective interdisciplinary research requires participants to learn critical concepts from fields other than the ones in which they were trained. However, this learning is often self-directed—often with a minimal amount of guidance from colleagues—and rarely takes place in a systematic training environment in which concepts are learned in a logical progression. Moreover, learning concepts from other disciplines takes time that could otherwise be devoted to advancing knowledge in one's own discipline. Since most scientists are trained within a single discipline and continue to identify with that discipline, peer recognition and other rewards for interdisciplinary research are frequently minimal and often absent altogether.

To promote effective interdisciplinary research in earthquake hazard reduction, three steps are required.

- Identify the specific areas in which interdisciplinary research is most needed,
- Establish the relative importance (in terms of budgetary allocations) of disciplinary and interdisciplinary research, and
- More completely identify the cognitive and social obstacles to interdisciplinary research.

Once these issues have been defined, suitable sociotechnical systems can be developed to promote interdisciplinary research. Such sociotechnical systems might be single research projects, broader research programs, or longer-lived research centers. The technical component must include the facilities, equipment, and materials needed to perform interdisciplinary research. The social component obviously comprises the research personnel and their formal organization, but this component must be based on effective systems for recruitment, selection, training, leadership, communication, motivation, and performance evaluation. Less obviously, the social component requires an understanding of informal social processes in multidisciplinary organizations—especially the potential effect of differences in beliefs, values, and norms that can produce dysfunctional organizational cultures and climates which, in turn, can produce ineffective performance or outright failure in organizations with interdependent components.