THE FUTURE OF SCIENTIFIC KNOWLEDGE DISCOVERY IN OPEN NETWORKED ENVIRONMENTS
Summary of a Workshop (2012)

Digital technologies and networks are now part of everyday work in the sciences, and have enhanced access to and use of scientific data, information, and literature significantly. They offer the promise of accelerating the discovery and communication of knowledge, both within the scientific community and in the broader society, as scientific data and information are made openly available online. The focus of this project was on computer-mediated or computational scientific knowledge discovery, taken broadly as any research processes enabled by digital computing technologies. Such technologies may include data mining, information retrieval and extraction, artificial intelligence, distributed grid computing, and others. These technological capabilities support computer-mediated knowledge discovery, which some believe is a new paradigm in the conduct of research. The emphasis was primarily on digitally networked data, rather than on the scientific, technical, and medical literature. The meeting also focused mostly on the advantages of knowledge discovery in open networked environments, although some of the disadvantages were raised as well.

The workshop brought together a set of stakeholders in this area for intensive and structured discussions. The purpose was not to make a final declaration about the directions that should be taken, but to further the examination of trends in computational knowledge discovery in the open networked environments, based on the following questions and tasks:

1. **Opportunities and Benefits**: What are the opportunities over the next 5 to 10 years associated with the use of computer-mediated scientific knowledge discovery across disciplines in the open online environment? What are the potential benefits to science and society of such techniques?

2. **Techniques and Methods for Development and Study of Computer-mediated Scientific Knowledge Discovery:** What are the techniques and methods used in government, academia, and industry to study and understand these processes, the validity and reliability of their results, and their impact inside and outside science?

3. **Barriers:** What are the major scientific, technological, institutional, sociological, and policy barriers to computer-mediated scientific knowledge discovery in the open online environment within the scientific community? What needs to be known and studied about each of these barriers to help achieve the opportunities for interdisciplinary science and complex problem solving?

4. **Range of Options:** Based on the results obtained in response to items 1-3, define a range of options that can be used by the sponsors of the project, as well as other similar organizations, to obtain and promote a better understanding of the computer-mediated scientific knowledge discovery processes and mechanisms for openly available data and information online across the scientific domains. The objective of defining these options is to improve the activities of the sponsors (and other similar organizations) and the activities of researchers that they fund externally in this emerging research area.

The Future of Scientific Knowledge Discovery in Open Networked Environments: Summary of a Workshop summarizes the responses to these questions and tasks.

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For More Information
Copies of *The Future of Scientific Knowledge Discovery in Open Networked Environments: Summary of a Workshop* is available from the National Academies Press; call (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area), or visit the NAP web site at www.nap.edu. For more information on the project, contact staff at (202) 334-1531 or visit the Board on Research, Data and Information website at www.nap.edu/pga/brdi.