Observatory Design And Requirements Neon

Since the first commercial introduction of transgenic corn plants in 1995, biotechnology has provided enormous benefits to agricultural crop production. Research is underway to develop a much broader range of genetically engineered organisms (GEOs), including fish, trees, microbes, and insects, that could have the potential to transform fields such as aquaculture, biofuels production, bioremediation, biocontrol, and even the production of pharmaceuticals . However, biotechnology is not without risk and continues to be an extremely controversial topic. Chief among the concerns is the potential ecological effects of GEOs that interact with wildlife and habitats. The U.S. Geological Survey (USGS) is charged with providing scientific advice to inform federal agencies that manage wildlife and their habitats. USGS has identified biotechnology as one of its major challenges for future research. Seeing an opportunity to initiate a dialogue between ecologists and developers of GEOs about this challenge, the USGS and the National Research Council (NRC) held a two-day workshop in November of 2007, to identify research activities with the greatest potential to provide the information needed to assess the ecological effects of GEOs on wildlife and habitats. The workshop, designed to

approach the research questions from a habitat, rather than transgenic organism, perspective, is summarized in this book.

Degradation of the nation's water resources threatens the health of humans and the functioning of natural ecosystems. To help better understand the causes of these adverse impacts and how they might be more effectively mitigated, especially in urban and human-stressed aquatic systems, the National Science Foundation (NSF) has proposed the establishment of a Collaborative Large-scale Engineering Analysis Network for Environmental Research (CLEANER). This program would provide a platform for near-real-time and conventional data collection and analysis; improve understanding and prediction of processes controlling large-scale environmental and hydrologic systems; help explain human-induced impacts on the environment; and help identify more effective adaptive management approaches to mitigate adverse impacts of human activities on water and land resources. At NSF's request, the National Academies undertook a review this proposed program. The resultant report recommends that NSF proceed with its planning, implementation, and intra- and interagency coordination activities for the program, as a successful environmental observatory network could transform the environmental engineering profession and increase its already considerable contributions

to society.

Modern geoscience research informs many important decisions and projects, such as geological disaster preparation, natural resource extraction, and global development. This critical research relies on technology and collaboration at state-of-the-art seismological and geodetic facilities. Currently, these facilities provide a wide variety of observation systems that support scientists' understanding of Earth and its changing environmental systems. As emerging technologies develop rapidly, seismological and geodetic facilities have new capabilities and more complex management and research communication systems. This requires a reevaluation of management structures and best practices within these facilities. The National Academies convened a 1.5-day workshop to discuss management models of theoretical seismological and geodetic facilities of the future. Initial discussions built upon a 2015 Incorporated Research Institutions for Seismology community workshop report, which identified current and future capabilities of these research facilities. Management models from other types of scientific facilities were used as a springboard for further discussions about management and decision-making models that could be applied to seismological and geodetic facilities. Workshop participants also emphasized the importance of distributing capabilities among multiple

facilities. Lastly, this workshop explored complex management topics in these facilities including instrumentation, user support services, data management, education and outreach, and workforce development capabilities. This publication summarizes the presentations and discussions from the workshop.

Illustrates a collection of the best signs submitted to the annual design competition, ranging from ground and wall signs to illuminated awnings

In recent years the organisation and practice of collaboration in the life sciences has undergone radical transformations, owing to the advent of big science enterprises, newly developed data gathering and storage technologies, increasing levels of interdisciplinarity, and changing societal expectations for science. Collaboration in the New Life Sciences examines the causes and consequences of changing patterns of scientific collaboration in the life sciences. This book presents an understanding of how and why collaboration in the life sciences is changing and the effects of these changes on scientific knowledge, the work lives and experiences of scientists, social policy and society. Through a series of thematically arranged chapters, it considers the social, technical, and organizational facets of collaboration, addressing not only the rise of new forms of collaboration in the life sciences, but also examining recent developments in two broad

research areas: ecology and environment, and the molecular life sciences. With an international team of experts presenting case studies and analyses drawn from the US, UK, Asia and Europe, Collaboration in the New Life Sciences will appeal not only to scholars and students of science and technology studies, but also to those interested in science and social policy, and the sociology of work and organisations.

The book endorses the National Science Foundation's concept of the National Ecological Observatory Network (NEON) for providing a nationwide network of facilities and infrastructure for ecological and environmental research that is impossible with existing infrastructure. The committee identified six grand challenges in environmental biology - biodiversity, biogeochemical cycles, climate change, ecology and evolution of infectious diseases, invasive species and land and habitat use -- that deserves high priority for research and needs to be addressed on a regional or continental scale. However, the book says that NEON needs a refined focus and a more detailed plan for its implementation to ensure the maximization of its contribution to science and to better fit within the purview of Major Research Equipment and Facilities Construction funding.

Prepared for the 2013 National Climate Assessment and a landmark study in terms of its breadth and

depth of coverage, Great Plains Regional Technical Input Report is the result of a collaboration among numerous local, state, federal, and nongovernmental agencies to develop a comprehensive, state of the art look at the effects of climate change on the eight states that encompass the Great Plains region. The Great Plains states are already experiencing the impacts of a changing climate, and will likely continue to experience warming temperatures, more extreme precipitation events, reduced snow and ice cover, and rising relative sea levels. The book presents a review of the historic, current, and projected future climate of the region; describes interactions with important sectors of the Northeast and examines cross-sectoral issues, namely climate change mitigation, adaptation, and education and outreach. Rich in science and case studies, it examines the latest climate change impacts, scenarios, vulnerabilities, and adaptive capacity and offers decision makers and stakeholders a substantial basis from which to make informed choices that will affect the well-being of the region's inhabitants in the decades to come.

Ecosystems change on a multitude of spatial and temporal scales. While analyses of ecosystem dynamics in short timespans have received much attention, the impacts of changes in the long term have, to a great extent, been neglected, provoking a lack of information and methodological know-how in

this area. This book fills this gap by focusing on studies dealing with the investigation of complex, long-term ecological processes with regard to global change, the development of early warning systems, and the acquisition of a scientific basis for strategic conservation management and the sustainable use of ecosystems. Within this book, theoretical ecological questions of long-term processes, as well as an international dimension of long-term monitoring, observations and research are brought together. The outcome is an overview on different aspects of long-term ecological research. Aquatic, as well as terrestrial ecosystems are represented.
Commerce, Justice, Science, and Related Agencies Appropriations for 2015Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, One Hundred Thirteenth Congress, Second SessionNeonAddressing the Nation's Environmental ChallengesNational Academies Press

We live in an age of ubiquitous genomics. Next generation sequencing (NGS) technology, both widely adopted and advancing at pace, has transformed the data landscape, opening up an enormous source of heritable characters to the comparative biologist. Its impact on systematics, like many other fields of biology, has been felt throughout its breadth: from defining species boundaries to estimating their evolutionary histories. This volume examines the broad range of ways in which NGS data are being used in systematics and in the fields that it underpins, from biodiversity prospecting to

evo-devo. Experts in their fields draw on contemporary case studies to demonstrate state-of-the-art applications of NGS data. These, along with novel analyses, comprehensive reviews and lively perspectives, are combined to produce an authoritative account of contemporary issues in systematics that have been impacted by the adoption of NGS.

As one of the eighteen field-specific reports comprising the comprehensive scope of the strategic general report of the Chinese Academy of Sciences, this sub-report addresses long-range planning for developing science and technology in the field of ecological and environmental science. They each craft a roadmap for their sphere of development to 2050. In their entirety, the general and sub-group reports analyze the evolution and laws governing the development of science and technology, describe the decisive impact of science and technology on the modernization process, predict that the world is on the eve of an impending S&T revolution, and call for China to be fully prepared for this new round of S&T advancement. Based on the detailed study of the demands on S&T innovation in China's modernization, the reports draw a framework for eight basic and strategic systems of socio-economic development with the support of science and technology, work out China's S&T roadmaps for the relevant eight basic and strategic systems in line with China's reality, further detail S&T initiatives of strategic importance to China's modernization, and provide S&T decision-makers with comprehensive consultations for the development of S&T innovation consistent with China's reality. Supported by illustrations and tables of data, the reports provide researchers, government officials and entrepreneurs with guidance concerning research directions, the planning process, and investment. Founded in 1949, the Chinese Academy of Sciences is the nation's highest academic institution in natural sciences. Its major responsibilities are to

conduct research in basic and technological sciences, to undertake nationwide integrated surveys on natural resources and ecological environment, to provide the country with scientific data and consultations for government's decision-making, to undertake government-assigned projects with regard to key S&T problems in the process of socio-economic development, to initiate personnel training, and to promote China's high-tech enterprises through its active engagement in these areas.

Terrestrial Ecosystem Research Infrastructures: Challenges and Opportunities reveals how environmental research infrastructures (RIs) provide new valuable insights on ecological processes that cannot be realized by more traditional short-term funding cycles and are integral to understand our changing world. This book bonds the latest state-of-the-science knowledge on environmental RIs, the challenges in creating them, their place in addressing scientific frontiers, and the new perspectives they bear. Each chapter is thoughtfully invested with fresh viewpoints from the environmental RI vantage as the authors explore and explain many topics such as the rationale and challenges in global change, field and modeling platforms, new tools, challenges in data management, distilling information into knowledge, and new developments in large-scale RIs. This work serves an advantageous guide for academics and practitioners alike who aim to deepen their knowledge in the field of science and project management, and logistics operations.

In 1995, the National Science Foundation (NSF) created a special account to fund large (several tens of millions of dollars) research facilities. Over the years, these facilities have come to represent an increasingly prominent part of the nationâ€™s R&D portfolio. Recently concern has intensified about the

way NSF is selecting projects for this account. In 2003, six U.S. Senators including the chair and ranking member of the Senate Subcommittee on VA, HUD, and Independent Agencies Appropriations expressed these concerns in a letter to the NRC asking it to â€œreview the current prioritization process and report to us on how it can be improved.â€ This report presents a series of recommendations on how NSF can improve its priority setting process for large research facilities. While noting that NSF has improved this process, the report states that further strengthening is needed if NSF is to meet future demands for such projects.