



Government-University-Industry Research Roundtable Policy and Global Affairs

List of selected reports from the Academies related to the meeting topic: Smart Communities for the Future

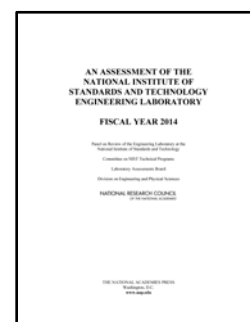


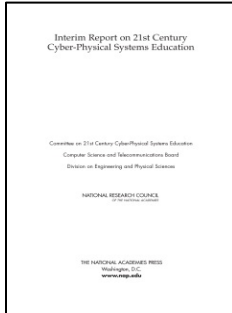
Privacy Research and Best Practices: Summary of a Workshop for the Intelligence Community (DEPS, 2016)

Recent disclosures about the bulk collection of domestic phone call records and other signals intelligence programs have stimulated widespread debate about the implications of such practices for the civil liberties and privacy of Americans. In the wake of these disclosures, many have identified a need for the intelligence community to engage more deeply with outside privacy experts and stakeholders. At the request of the Office of the Director of National Intelligence, the National Academies of Sciences, Engineering, and Medicine convened a workshop to address the privacy implications of emerging technologies, public and individual preferences and attitudes toward privacy, and ethical approaches to data collection and use. This report summarizes discussions between experts from academia and the private sector and from the intelligence community on private sector best practices and privacy research results.

Assessment of the National Institute of Standards and Technology Engineering Laboratory: Fiscal Year 2014 (DEPS, 2015)

The mission of the Engineering Laboratory of the National Institute of Standards and Technology (NIST) is to promote U.S. innovation and industrial competitiveness through measurement science and standards for technology-intensive manufacturing, construction, and cyberphysical systems in ways that enhance economic prosperity and improve the quality of life. To support this mission, the Engineering Laboratory has developed thrusts in smart manufacturing, construction, and cyberphysical systems; in sustainable and energy-efficient manufacturing materials and infrastructure; and in disaster-resilient buildings, infrastructure, and communities. The technical work of the Engineering Laboratory is performed in five divisions: Intelligent Systems; Materials and Structural Systems; Energy and Environment; Systems Integration; and Fire Research; and two offices: Applied Economics Office and Smart Grid Program Office. *An Assessment of the National Institute of Standards and Technology Engineering Laboratory Fiscal Year 2014* assesses the scientific and technical work performed by the NIST Engineering Laboratory. This report evaluates the organization's technical programs, portfolio of scientific expertise within the organization, adequacy of the organization's facilities, equipment, and human resources, and the effectiveness by which the organization disseminates its program outputs.





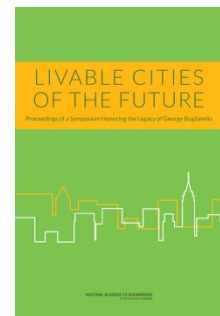
Interim Report on 21st Century Cyber-Physical Systems Education (DEPS, 2015)

Cyber-physical systems (CPS) are increasingly relied on to provide the functionality and value to products, systems, and infrastructure in sectors including transportation, health care, manufacturing, and electrical power generation and distribution. CPS are smart, networked systems with embedded sensors, computer processors, and actuators that sense and interact with the physical world; support real-time, guaranteed performance; and are often found in critical applications. Cyber-physical systems have the potential to provide much richer functionality, including efficiency, flexibility, autonomy, and reliability, than systems that are loosely coupled, discrete, or manually operated, but also can create vulnerability related to security and reliability. Advances in CPS could yield systems that can communicate and respond faster than humans; enable better control and coordination of large-scale systems,

such as the electrical grid or traffic controls; improve the efficiency of systems; and enable advances in many areas of science. As CPS become more pervasive, so too will demand for a workforce with the capacity and capability to design, develop, and maintain them. Building on its research program in CPS, the National Science Foundation (NSF) has begun to explore requirements for education and training. As part of that exploration, NSF asked the National Research Council of the National Academies to study the topic. Two workshops were convened in 2014, on April 30 and October 2-3 in Washington, D.C., to explore the knowledge and skills required for CPS work, education, and training requirements and possible approaches to retooling engineering and computer science programs and curricula to meet these needs. *Interim Report on 21st Century Cyber-Physical Systems Education* highlights emerging themes and summarizes related discussions from the workshops.

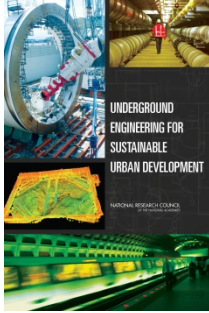
Livable Cities of the Future: Proceedings of a Symposium Honoring the Legacy of George Bugliarello (NAE, 2014)

At the beginning of the 20th century an estimated five percent of the world's population lived in cities. Today, half the world's population is urbanized. Urban sustainability is multifaceted and encompasses security, economics, environment and resources, health, and quality of life. It can be viewed as the intersection of two extremely complex and not yet fully understood processes, urbanization and global sustainability, which will increasingly overlap as urban populations continue to grow. Effective policies are critical for addressing urban sustainability, and must be politically realistic in deciding on appropriate balances, such as centralized versus decentralized systems, "soft" versus "hard" solutions, local versus regional focus, agriculture versus pollution, and free markets versus interventions. Livable Cities of the Future, a symposium honoring the legacy of George Bugliarello, was hosted October 26, 2012, by the Polytechnic Institute of New York University (NYU-Poly) in the Pfizer Auditorium of the Bern Dibner Library of Science and Technology. The event brought together more than 200 engineers, civic leaders, educators, and futurists to discuss how George Bugliarello's vision manifests itself in innovative urban planning for the cities of tomorrow. This report is a summary of the presentations and discussion at that event. The symposium objectives were to cultivate ideas for best practices and innovative strategies for sustainable urban development and to facilitate the evolution of New York City to a real-life laboratory for urban innovation. Participants heard the perspectives and experiences of representatives from private and public service operators, infrastructure agencies, and the academic community. Elected officials and other stakeholders in urban and other sectors examined issues critical to resilient and sustainable cities, such as energy, water supply and treatment, public health, security infrastructure, transportation, telecommunications, and environmental protection.



Pathways to Urban Sustainability: Perspective from Portland and the Pacific Northwest: Summary of a Workshop (PGA, 2014)

For more than 40 years, the Portland Metropolitan Region has been a national leader in urban policies and investments intended to revitalize the central city and adjacent neighborhoods, preserve the environment, improve equity, and make the city more economically competitive and livable. Among the elements contributing to Portland's success have been strong public-private partnerships, a culture of planning, and a willingness to implement diverse ideas generated by federal, state, and local agencies, academics, and the private sector. This report summarizes a 2013 workshop that examined issues related to sustainability in the Portland metropolitan and greater Pacific Northwest regions. Presentations and discussions explored the role of land use restrictions on development, transportation innovations, and economic and social challenges, among other subjects. The workshop was the third in a series of place-based workshops on urban sustainability, preceded by events in Atlanta and Houston.



Underground Engineering for Sustainable Urban Development (DELS, 2013)

For thousands of years, the underground has provided humans refuge, useful resources, physical support for surface structures, and a place for spiritual or artistic expression. More recently, many urban services have been placed underground. Over this time, humans have rarely considered how underground space can contribute to or be engineered to maximize its contribution to the sustainability of society. As human activities begin to change the planet and population struggle to maintain satisfactory standards of living, placing new infrastructure and related facilities underground may be the most successful way to encourage or support the redirection of urban development into sustainable patterns. Well maintained, resilient, and adequately performing underground infrastructure, therefore, becomes an essential part of sustainability, but much remains to be learned about improving the sustainability of underground infrastructure itself.

At the request of the National Science Foundation (NSF), the National Research Council (NRC) conducted a study to consider sustainable underground development in the urban environment, to identify research needed to maximize opportunities for using underground space, and to enhance understanding among the public and technical communities of the role of underground engineering in urban sustainability. Underground Engineering for Sustainable Urban Development explains the findings of researchers and practitioners with expertise in geotechnical engineering, underground design and construction, trenchless technologies, risk assessment, visualization techniques for geotechnical applications, sustainable infrastructure development, life cycle assessment, infrastructure policy and planning, and fire prevention, safety and ventilation in the underground. This report is intended to inform a future research track and will be of interest to a broad audience including those in the private and public sectors engaged in urban and facility planning and design, underground construction, and safety and security.

About the Government-University-Industry Research Roundtable (GUIRR)

GUIRR's mission is to convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national and global science and technology agenda that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders. The forum is designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public.



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