



2016 ANNUAL REPORT

Government-University-Industry Research Roundtable



MISSION

GUIRR's historical objective, formulated by the membership in a 1997 retreat, has been

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.

As stated above, GUIRR's historical mission has been "to convene," i.e., to hold meetings. It is true that GUIRR holds meetings, but the phrasing suggests convening is the objective, not the means. This in turn implies that the metric of success for GUIRR should be more meetings, or longer meetings, or larger meetings. To prevent this mission statement from becoming a self-fulfilling prophecy, we utilize a somewhat less elegant but more accurate rephrasing of GUIRR's mission statement:

To improve the research enterprise of the United States by successfully resolving the cross-sectoral issues that prevent the U.S. research enterprise from reaching its full potential. This mission is achieved by convening senior-most representatives from government, universities, and industry to frame the critical issues, followed – when appropriate – by the execution of activities designed to address specific cross-sectoral impediments to achieving a healthy, vibrant research enterprise.

This unofficial mission statement reflects GUIRR's goal to improve the research enterprise. As a forum, GUIRR is designed to facilitate candid dialogue among participants, to catalyze and foster follow-on activities, and, where appropriate, to carry awareness of consequences to the wider public. By focusing its mission on big national and global challenges that require participation from at least two or more its constituent sectors, GUIRR maintains an important niche in the S&T policy landscape.

HISTORY AND EVOLUTION

GUIRR was created in 1984 in response to the report of the National Commission on Research, which called for an institutionalized forum to enhance communication among the top leaders of government and non-government research organizations. The membership of GUIRR was originally set completely by appointment through the National Academies presidents, a function of the Roundtable having the three Councils (NAS, NAE, NAM) as its oversight bodies. However, over time, GUIRR evolved to include three principal categories of membership.

MEMBERS

GUIRR COUNCIL MEMBERS include the three presidents of the Academies (NAS, NAE, NAM), the heads of major federal R&D agencies (for non-R&D agencies, the head of the largest R&D-performing subdivision), and a small selection of university presidents and industry CEOs as appointed by president of the National Academy of Sciences. With the exception of the federal agency officials, who serve as ex-officio members for as long as they are in office, Roundtable Council members are appointed to staggered three-year terms.

COUNCIL ASSOCIATES are designated by individual federal agency heads as their alternate representatives to GUIRR. The Council Associates largely represent the senior-most non-political

appointee staff of the agencies. Because these individuals do not turn over with each new Administration, they typically have a long and deep understanding of their agencies' history, personnel, and operations. It is common for Council Associates to become the acting agency directors between administrations.

UNIVERSITY-INDUSTRY PARTNERS are the dues-paying institutional members of GUIRR. A university and industry are invited to enter GUIRR as a joined pair; this mechanism is designed to maintain a sectoral (50:50) balance within GUIRR. Because the membership is an institutional one, the member institutions may send anyone they like to attend and participate in GUIRR meetings. This is in contrast to the Council membership, which is by appointment to the person and cannot be delegated. In GUIRR operations, the university-industry partners act as "antennae" to bring into GUIRR discussions the most current ideas and issues facing government-university-industry research cooperation across the country, and to help disseminate ideas.

In 2012, a fourth category was established: **GUIRR DISTINGUISHED FELLOWS**. Members of this category are individuals who are former Council members and have either (1) served the maximum allowable two consecutive three-year terms or (2) no longer qualify as federal ex officio members because their federal appointment was during a previous Administration, and yet these individuals wish to remain engaged in Roundtable activity. GUIRR's Executive Committee reviews and approves nominations of individuals for this special member category. Six people were named in this category in 2016.

Leadership for GUIRR is composed of two **co-chairs** – one from industry (currently Dr. Gordon England, Chairman, V1 Analytical Solutions, Inc.) and one from academe (Dr. Laurie Leshin, President, Worcester Polytechnic Institute), appointed by the president of the National Academy of Sciences.

A GUIRR **Executive Committee** serves atop the organizational structure and helps to ensure that the three constituencies share a common view of where GUIRR ought to be headed and which priorities are most important. The GUIRR Director works closely with the Executive Committee, composed in 2016 of the two co-chairs plus a representative from the National Academies (currently NAE president C. D. Mote, Jr.), the federal agencies (currently Dr. France Cordova, Director of NSF; Dr. Christopher Austin, Director, National Center for Advancing Translational Sciences (NCATS), NIH; and Dr. Catherine Woteki, Under Secretary for Research, Education and Economics and Chief Scientist, USDA), and two individuals representing our University-Industry Partners (Dr. Erik Antonsson, Corporate Director of Technology, Northrop Grumman Corporation and Dr. Stephen Cross, Executive Vice President for Research, Georgia Institute of Technology).

Economic leadership consists of the supporting federal agencies and the dues-paying University-Industry partners.

MEETINGS

GUIRR convenes three general member meetings per year on a diverse array of topics considered timely, in need of greater cross-sector collaboration, and of pressing concern to the nation. Over time, driven largely by the interests of member organizations, the topics have moved more into the realm of "grand challenges." GUIRR takes pride in its nimbleness and agility, selecting its next focal topic/theme while concluding its current topic. GUIRR is oftentimes an "early voice" to challenging high-level policy issues before a broader dialogue takes root within the S&T and research community. The goal with each meeting and group discussion is to inject imaginative thought into the system and identify touch-points

for better tri-sector – meaning government, university, and industry – collaboration, cooperation, and coordination. Meeting attendance is strong, typically 80 to 100 people.

A dedicated webpage is developed in advance and in support of each topical meeting, containing speaker bios and links to related articles, Academy reports, and other reference material. After each meeting, an individually authored summary (“Proceedings of a Workshop- in Brief”) is prepared, printed, and distributed to members. GUIRR pioneered this summary publication in response to member requests for a short, succinct, and tangible deliverable that they could share with their colleagues. Generally eight (8) pages in length, the piece undergoes internal and external review before public release.

Meeting topics in the 2016 calendar year include:

- **February 23-24, 2016 – Critical Infrastructure Security: The Role of Public Private Partnerships**

Critical infrastructure as defined in the 2013 National Infrastructure Protection Plan consists of “systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters.” The term refers to the essential systems that support transportation, energy generation and delivery, water treatment and delivery, food production and delivery, telecommunication, financial activity, critical manufacturing, and life-saving emergency services—the systems that sustain necessary, day-to-day socioeconomic activities in the United States.

GUIRR members determined that further research into the cross-sector dependencies of critical infrastructure sectors and the cascading effects of a breach to any of these sectors is necessary to ensure the country’s critical infrastructure, and this research demands cross-sector collaboration and information sharing at nearly all levels. In 2014, the National Infrastructure Advisory Council, which advises the President through the Department of Homeland Security on issues related to critical infrastructure security, concluded that—despite the challenges they present—public-private partnerships are essential to confronting new and evolving threats to critical infrastructure security and recommended that academic institutions must be leveraged as “neutral forums” for these partnerships to develop.

This particular GUIRR meeting explored (1) the state of critical infrastructure security in the United States and identified R&D priorities, (2) methods of modeling and assessing vulnerabilities in critical infrastructure security to prevent breaches or minimize cascading effects, (3) how communication across sectors and public-private partnerships can enhance critical infrastructure security, and (4) how pending legislation impacts physical and cyber infrastructure security. Over 80 individuals participated in the meeting and discussion.

As a **pre-meeting event**, a special docent-led tour of the new American Enterprise exhibition at the Smithsonian National Museum of American History – in the Work and Industry wing – was offered to interested GUIRR members. Participant feedback was positive.

- **June 21-22, 2016 – Building Smart Communities for the Future**

Over half the world's population currently lives in urban areas, and in 2014 the United Nations released a report projecting that by 2050 that number will rise to 70 percent. With the trend of rapid urbanization in mind, many countries and cities have started planning to strategically support the development of

smart cities and communities: urban centers – enabled by ICT technology and reinforced by sustainability and livability goals – that maximize resource allocation and efficiency of services through intelligent, connected devices and automated systems.

Smart communities commonly utilize tools including cloud based services, Internet of Things (IoT) devices, smart phones, RFIDs, network sensors, data management platforms, and other online collaborative programs. Typically cities and communities use these technologies to enhance the efficiency and effectiveness of urban mobility, infrastructure, energy production and use, community health, and citizen participation and governance. Smart cities and communities will develop differently around the world in consideration of local urban challenges, but a concerted effort by government, universities, and industry to understand the key characteristics of smart communities and assess their impacts on development and economic growth is needed.

The Obama Administration announced a "Smart Cities" initiative in September 2015 to support technology collaborations in local communities that improve city services, but many other countries have already started to utilize the Internet of Things to enable multi-sector collaborations for better-connected, sustainable, resilient urban development. We attempted, with this meeting, to offer insight into best practices for developing smart communities in the United States and abroad. We also considered challenges associated with intelligent systems and policy implications.

Specifically, this meeting program and discussion was designed to explore (1) what the common characteristics of smart communities are today and what they might look like in the future; (2) how sustainability goals are increasingly becoming a smart community concern; (3) the dependence, by smart communities, on internet access and speed and what that means for communities in the United States and other countries; and (4) which best practices from cities around the world might be applicable to the United States in the development of smart communities.

- **October 25-26, 2016 – The Fourth Industrial Revolution**

The World Economic Forum (WEF) was early to focus attention on and address the implications of this latest revolution, which mirrors what Germany has labeled "Industry 4.0." The Founder and Executive Chairman of the WEF, Klaus Schwab, declared the world on the precipice of a "technical revolution that will fundamentally alter the way we live, work, and relate to one another... characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."

Our meeting explored the cross-sector collaboration between government, universities, and industry needed to accommodate the developments in emerging artificial intelligence, virtual and augmented reality, and Internet of Things technologies that will transform manufacturing practices. Meeting attendees discussed the technical characteristics of emerging industrial technologies and considered the economic and social implications of a 'fourth industrial revolution' that builds on the digitization breakthroughs of the past several decades. Our opening keynote presenter, quite appropriately, was a representative from the WEF.

We began with a review of a recent National Academy of Engineering report entitled *Making Value for America: Embracing the Future of Manufacturing, Technology, and Work*, looking to define opportunities for value creation within the context of emerging digital and distributed tools. We then considered the suite of emerging digital technologies with applications for manufacturing and production: (1) Industrial Internet of Things and Advanced Analytics; (2) Digital-Physical Systems, such as 3-D printing and digital

modeling tools; and (3) the Human-Technology Frontier, which encompasses robotics, artificial intelligence, and virtualization. The Director of NSF, Dr. France Cordova, has listed the human-technology frontier – particularly as it relates to and impacts the workforce – as one of her 10 Big Ideas going forward.

- **Strategic Planning Meeting – GUIRR Council and Executive Committee**

A special strategic planning meeting for members of the GUIRR Council and Executive Committee was held from 1-5 p.m. on October 25, 2016, in advance of the opening of the fall members meeting. The intent with this meeting was to allow our senior leadership to reflect on organizational process, accomplishments, and missed opportunities. More importantly, the group was asked to “look forward” to how GUIRR can best call attention to key issues and priorities, further the momentum on current important initiatives, facilitate cross-sector collaborations that support the nation’s S&T enterprise, catalyze action, and enact change. Formal presentations were made by NSF Director France Cordova, presenting her 10 Big Ideas for the agency, and by NIH-NCATS Director Chris Austin, who described challenges in advancing translational sciences. In particular, he presented information about the Tissue Chip for Drug Screening program and noted that the cutting-edge technology presents ample opportunity for public-private partnership. The session was led by GUIRR Co-chairs Laurie Leshin and Gordon England. Twenty-five senior leaders attended. A list of goals geared to better communicate and strengthen the ROI for members was generated as an outcome.

PROJECTS

Webinar Series – GUIRR continued its monthly webinar series, begun in August 2012, on topics of interest with crossover appeal to the GUIRR membership. The webinars are offered free-of-charge, though advance online registration is required. Since its inception, over 2,700 people have participated in the webinars (>500 of those unique listeners have attended more than one webinar) and just over 2,500 people are subscribed to receive announcements about upcoming webinars. Participation rate is 60 percent (of all registrants), a strong number for a free offering. Average attendance is 100. The webinars are recorded and openly available through the [GUIRR website](#). GUIRR Associate Program Officer Megan Nicholson manages and moderates the popular monthly series.

Webinars hosted during the 2016 calendar year include:

- **January 19, 2016** – *Manufacturing and Innovation: Making Value for America*
- **February 29, 2016** – *R&D Budget and Policy Update*
- **March 24, 2016** – *Foundation for Food and Agriculture Research*
- **April 27, 2016** – *The Maker Movement and Regional Innovation Ecosystems*
- **May 25, 2016** – *U.S. Census Bureau’s Innovation Measurement Initiative*
- **June 16, 2016** – *Smart Communities: Intelligent Space and Responsive Design* (tied to and intended as a complement to the June meeting theme)
- **July 21, 2016** – *I-Corps at the National Institutes of Health*
- **August 24, 2016** – *5G and Next Generation Wireless*
- **September 27, 2016** – *Promising Practices for Strengthening the Regional STEM Workforce Development Ecosystem*
- **October 27, 2016** – *Celebrating Scientific Success Stories with the Golden Goose Award*

- **November 17, 2016** – *From Idea to Impact: Highlights of VentureWell’s Initiatives to Develop Innovation Ecosystems*
- **December 15, 2016** – *Enhancing National Laboratory Partnership and Commercialization Opportunities*

International Research Collaborations – This working group (“I-Group”) was established in 2008 after the GUIRR meeting on “New Partnerships on a Global Platform.” Its focus is on the growing complexity of international relationships and research collaborations. Following on two previously hosted workshops and published summary reports (*Examining Core Elements of International Research Collaboration*, 2010-2011 and *Culture Matters: International Research Collaborations in a Changing World*, 2013-2014), the group began exploring, in 2016, the prospect of a dedicated workshop on research data and ethics in an international context. There is interest, too, in tying its focus to one or more of the 17 Sustainable Development Goals (SDGs). During the latter part of the year, I-Group members met monthly by teleconference to begin plans for a workshop to be held in the fall of 2017.

Angel Investments in University Research Commercialization and Entrepreneurship – Following on the success of a jointly hosted (GUIRR and the Angel Capital Association, ACA) workshop held in October 2015 (“Angel Investing: Helping Innovators Bridge the Valley of Death”), GUIRR and the ACA have proposed a project to conduct an in-depth look at the intersection between angel groups, research universities, economic ecosystems, and the successful commercialization of university-based R&D. In particular, the two organizations are interested in examining the overlaps between angel groups and successful R&D commercialization coming out of universities. Questions of interest include the following:

- What are the factors that affect the successful relationship between university research and angel investing?
- Does the presence of an angel network in a particular region help determine (enable, increase) the level of entrepreneurial activity by university researchers?
- Are there geographic linkages between where angel groups operate and where research is conducted in the United States? Does activity cluster by scientific discipline?
- Do private corporations view university spin-outs more favorably (in terms of eventual partnering, prospect for eventual acquisition or merger, etc.) if they received angel financing?

A research team at the University of Texas at Austin (a GUIRR partner institution) was identified and engaged to lead the project. The objective is to identify key factors that draw angel (early stage) capital to a community and to determine factors in navigating the university-based research to investment pathways. By year-end, the team began sharing its proposal among federal agency representatives in the hope of securing modest funding. The effort will continue in 2017.

T-Summit 2016 – On March 21-22, 2016, GUIRR co-hosted T-Summit 2016 with the newly independent UIDP (a former project of GUIRR), IBM, Michigan State University, and Virginia Tech. The event was held at the National Academy of Sciences building in Washington, DC. A formal call for proposals resulted in 60 submissions, with all but one accepted for presentation in some format (“TED-talk”, panel, poster, World Café event). Over the past decade, research has emphasized the need for today’s young professionals to possess deep disciplinary knowledge along with agility and a keen ability to communicate across social, cultural and economic boundaries. This event, which drew 280 attendees, emphasized the need to develop “T-shaped professionals,” addressing curricular reform, workforce preparation, organizational talent and innovation. For details, please visit <http://tsummit.org>.

Federal Demonstration Partnership (FDP) – One of GUIRR’s earliest accomplishments was the launching of the Florida Demonstration Project in 1986. This effort ultimately became the 400+ person Federal Demonstration Partnership (FDP) of today. The FDP was launched initially to address the very serious problems generated by then-extant federal regulations regarding sponsored research activities at universities – for example, the inability to carry forth one year’s funding to the next, generating artificial end-of-year spendouts and stranding students mid-degree. The purpose of the FDP, then and now, is to reduce the administrative burdens associated with research grants and contracts. It does so through cooperative demonstrations, or experiments, or new approaches that involve some subset of the 154 institutional and 10 federal member organizations that constitute the Phase VI members of the FDP. [<http://www.thefdp.org>]

Much of the FDP’s work has resulted in tangible changes to federal agency systems. Its members meet thrice yearly in Washington, DC. GUIRR has remained the neutral convener of the FDP for nearly 30 years, and still provides staff support, fundraising, and the logistical framework under which FDP operates. The FACA exemption under which GUIRR operates allows the FDP to convene federal agency and university representatives in the same room to address common problems. This exemption is obviously critical to the functioning of FDP.

The FDP operates in six-year “phases.” FDP Phase IV began October 1, 2002 with over 90 educational institutions/consortia, 10 federal agencies, and four affiliate members, and made notable strides in improving how federal agencies and the research community work together to ensure the efficiency and the integrity of the research enterprise. Phase V officially began on October 1, 2008, with membership at 119 research organizations and 10 federal agencies. Of these, 14 are emerging research organizations (ERIs). In September 2014 the FDP transitioned to Phase VI, expanding to include 154 research institutions (of which 26 are ERIs) and 10 federal agencies. Eight professional associations are also affiliated with the FDP as members. Phase VI will conclude in 2020, with transition discussions already underway.

GUIRR STAFF

Susan Sauer Sloan, Director
Megan Nicholson, Associate Program Officer
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Cynthia Getner, Financial Officer

MEMBERSHIP - 2016

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Vice President, Systems (retired)
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Chief Scientist
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Pending

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Director of Innovation Partnerships
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Dr. Fred King
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GUIRR Distinguished Fellows

Lieutenant General Spence (Sam) Armstrong [2012]

U.S. Air Force, retired
Former Senior Advisor to the Administrator
National Aeronautics and Space Administration

Dr. Arden L. Bement, Jr. [2014]

Chief Global Affairs Emeritus,
David A. Ross Distinguished Professor of Nuclear Engineering, and
Director Emeritus of the Global Policy Research Institute, Purdue University
Former Director, National Science Foundation

Dr. Uma Chowdhry [2015]

Chief Science and Technology Officer, Emeritus
DuPont Company
GUIRR Industry Co-Chair, 3/1/2012 - 3/1/2015

Dr. Jacques Gansler [2016]

Emeritus Professor and Roger C. Lipitz Chair in Public Policy and Private Enterprise, School of Public Policy
University of Maryland
GUIRR University Co-Chair, 6/1/2013 - 6/30/2016

Mr. Andrew W. Reynolds [2016]

Strategic Foresight Consultant
Science, Engineering and Technology for Development
Former Deputy S&T Advisor to the Secretary of State

Dr. Lydia Waters Thomas [2012]

President and Chief Executive Officer, retired
Noblis
GUIRR Industry Co-Chair, 7/1/2005 - 3/1/2012

**Number in brackets indicates year of induction as a GUIRR Distinguished Fellow;
Term is three (3) years with possibility for extension(s) subject to Executive Committee approval**