

Guide to FY2015 Research Funding at the National Institute of Standards and Technology (NIST)

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Summary and Index

This document provides succinct insights into the various NIST funding opportunities for University research, with special attention to changes anticipated in FY2015. More information relating to the NIST opportunities is provided at the Central Desktop “Mission Agency Program Site” (MAPS) website, including the charts cited in the text.

The NIST mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST offers grants to encourage extramural work in specific fields in support of intramural programs: precision measurement, fire research, and materials science. There are two large-scale programs: the NIST Centers of Excellence program, in support intramural programs, and a Cyberinfrastructure Federally Funded Research and Development Center (FFRDC, which USC is pursuing).

NIST also has the National Strategy for Trusted Identities in Cyberspace Grants Program (as part of the National Cybersecurity Center of Excellence, NCCoE), the Advanced Manufacturing Technology Consortium (AMTech) Program, and hosts the National Manufacturing National Program Office that administers the National Network for Manufacturing Innovation (NNMI).

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Appendix 1: FY2015 New Programs and/or Significant Change

	<u>\$M Growth from FY2014</u>	<u>page</u>
University Center of Excellence	at least one new competition	10
National Network for Manufacturing Innovation (NNMI)	0 in FY2014 to \$2.4B	10
There will be other agency announced NNMI competitions		
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Overview

NIST is the federal technology agency that works with industry to develop and apply technology, measurements, and standards. In addition to its intramural laboratories, NIST partners with 1,300 manufacturing specialists and staff at about 350 MEP service locations around the country. It is also developing a suite of University based Centers of Excellence in support of its intramural program and a Federally Funded Research and Development Center (FFDRC) in support of its National Cybersecurity Center of Excellence (NCCoE).

Grants/awards supporting research at industry, academic, and other institutions are available on a competitive basis through several different Institute offices. NIST offers grants to encourage extramural work in specific fields in support of intramural programs: precision measurement, fire research, and materials science. It also has extramural opportunities in advanced manufacturing, wireless innovation, and trusted identities in cyberspace. The Small Business Innovation Research Program funds R&D proposals from small businesses.

Unless otherwise specified, applicants for many of the NIST opportunities must submit an abbreviated proposal for preliminary screening. Based on the merit of the abbreviated proposal, applicants will be advised whether a full proposal should be submitted. Proposals may be submitted by paper or electronically. Paper proposals must be submitted in triplicate (an original and two copies) and sent to the appropriate research grant program office personnel. Electronic proposals must be submitted via Grants.gov at www.grants.gov. Submitters of electronic proposals should carefully follow specific Grants.gov instructions to ensure the attachments will be accepted by the Grants.gov system.

All proposals received will be assigned to the appropriate program and reviewed to determine whether or not they are eligible, complete, and responsive to the Federal Funding Opportunity (FFO), the scope of the stated program objectives and are compatible with the respective grant program areas and the relevance to the objectives of the respective grant program. Proposals determined to be ineligible, incomplete, and/or non-responsive may be eliminated from further review. Those considered viable will have at least three independent, objective individuals knowledgeable about the particular scientific area described in the proposal conduct a technical review, based on evaluation criteria: rationality, qualifications of technical personnel, resources availability, technical merit of contribution, potential impact of the results, and match of budget to proposed work. The relative weighting of these criteria will depend on the solicitation.

In FY2015 NIST proposes to augment the following intramural programs (an indication of evolving NIST priorities):

<u>Item</u>	<u>\$M</u>
Cyberphysical Systems	7.5
Advanced Materials	5
Forensic Science	3.5
Synthetic Biology	7
Lab to Market (Technology Transfer)	6
Manufacturing Innovation Inst. Coordination	5

Measurement Science and Engineering (MSE) Research Grant Programs

2014-NIST-MSE-01

<http://www.nist.gov/director/mse-020613.cfm>

This program supports NIST laboratories with research in fields such as: material measurement; physical measurement; engineering; fire research; information technology; neutron research; nanoscale science and technology; standards services; and law enforcement standards. (See NIST Chart 5) The project funding depends on the program, but ranges from \$5K to \$1M.

- (1) Material Measurement Laboratory (MML);
- (2) Physical Measurement Laboratory (PML);
- (3) Engineering Laboratory (EL);
- (4) Information Technology Laboratory (ITL);
- (5) NIST Center for Neutron Research (NCNR);
- (6) Center for Nanoscale Science and Technology (CNST);
- (7) Office of Special Programs (OSP); and
- (8) Associate Director for Laboratory Programs (ADLP).

Precision Measurement Grant Program (PMGP)

2014-NIST-PMGP-01

<http://www.nist.gov/pml/div684/fcdc/pmg.cfm>

NIST solicits proposals from eligible proposers (including institutes of higher education) to support significant research in the field of fundamental measurement or the determination of fundamental constants. A key requirement is that the proposed project supports NIST's ongoing work in the field of basic measurement science, which includes:

- Experimental and theoretical studies of fundamental physical phenomena which test the basic laws of physics or which may lead to new or improved fundamental measurement methods and standards.
- The determination of important fundamental physical constants.

NIST anticipates funding two (2) projects for up to three (3) years at \$50,000 per year in FY2014. (See NIST Chart 7)

NIST Centers of Excellence

<http://www.nist.gov/coe/>

In 2013 NIST launched a Centers of Excellence Program to provide an interdisciplinary environment where researchers from NIST, academia, and industry will collaborate on emerging areas of basic and applied research and innovations in measurement science. These centers are meant to:

- Foster expanded development of expertise in measurement science and its role in innovation through the education and training of scientists and engineers;
- Provide greater opportunities for NIST to engage with industry and entrepreneurs; and
- Enhance technical innovation through earlier alignment of measurement science with emerging and innovative fields of research.

The first center was competed on the topic *Materials Research to Advance Manufacturing and Innovation* and an award was made to a consortium led by Northwestern Univ., Center for Hierarchical Materials Design. Up to four Centers are projected. A second competition, on a topic yet to be determined, is anticipated in 2014 (See NIST Chart 8).

National Cybersecurity Center of Excellence (NCCoE)

<http://csrc.nist.gov/nccoe/>

The National Cybersecurity Center of Excellence (NCCoE), a public-private partnership hosted by NIST, is working with industry on projects designed to increase protections for private-sector intellectual property and data from cyber threats. NIST executed a Joint Project Agreement with the State of Maryland and Montgomery County, Maryland to establish the NCCoE, based at a facility shared by NIST and the State of Maryland, to engage the commercial, academic, and Federal, state, and local government sectors to:

- Foster transfer and broad adoption of cybersecurity capabilities and practices from the laboratory to practical, affordable, and useful business use cases and applications across the full range of commercial and government sectors;
- Research and develop new principles and mechanisms underlying security standards, metrics, and technologies;
- Promote the emergence of a private sector-led ecosystem for trusted identities in cyberspace;
- Establish a comprehensive library of practical and effective standards, guidelines, metrics, and best practices for secure and privacy preserving information technologies; develop and test methods for composing, discovering, monitoring, and measuring the mechanisms, configurations, and practices that affect the security posture of systems and enterprises; and
- Communicate cybersecurity principles and technologies to cyber systems developers, providers, and user.

Federally Funded Research and Development Center

<http://www.nist.gov/itl/ffrdc-industry-day.cfm>

To help the NCCoE address industry's needs most efficiently, NIST has announced its intention to sponsor a Federally Funded Research and Development Center (FFRDC). The FFRDC mechanism will allow a nonprofit organization to support the NCCoE. (See NIST Chart 9)

National Strategy for Trusted Identities in Cyberspace (NSTIC) Grants Program

<http://www.nist.gov/nstic/>

<http://www.nstic.us/>

A National Program Office has been established at the National Institute of Standards and Technology (NIST) to coordinate the federal activities needed to implement NSTIC. In cooperation with the National Telecommunications and Information Administration (NTIA), the office will lead activities involving public policy development and privacy protections. The National Program Office will serve as the point of contact to bring the public and private sectors together to meet this challenge. (See NIST Chart 11)

Communication Technology Laboratory (CTL)

http://www.nist.gov/public_affairs/releases/nist-ntia-mou-061413.cfm

In FY 2014, through a reprogramming request to Congress, NIST established a new Organizational Unit (OU), the Communication Technology Laboratory (CTL), under the Associate Director for Laboratory Programs. The CTL will be headquartered at the NIST facility in Boulder, Colorado and will be part of the joint NIST/NTIA Center for Advanced Communications (CAC), which will serve as a hub for collaboration with other government agencies, and industry. The center's mission is to advance the fundamental understanding of spectrum and spectrum usage to promote spectrum sharing approaches and innovation. It will:

- Enhance the effectiveness of both agencies by better coordinating the research, standards development and testing functions of NIST and NTIA in the area of advanced communications technology;
- Promote interdisciplinary research, development and testing in areas related to advanced communications such as radio frequency technology, digital information processing, cybersecurity, interoperability and usability; and
- Provide a single focal point for working with both industry and other government agencies on advanced communications technologies, including testing, validation and conformity assessment.

Nanoelectronics Research Initiative

Supports research and innovation in nanoelectronics through a five year partnership between NIST and the Semiconductor Research Corporation (SRC). A news release is available with details on the NIST/SRC partnership: http://www.nist.gov/public_affairs/releases/src.cfm. (The Federal Funding Opportunity 2012-NIST-POST-CMOS-01 was the mechanism for NIST to provide funds to SRC, who then competes the programs. Approximately \$2.5M NIST money was allocated for the funding of multi-year awards; industry will provide matching funds). (See NIST Chart 12)

Advanced Manufacturing National Program Office (AMNPO)

<http://manufacturing.gov/amnpo.html>

The Advanced Manufacturing NPO is charged with:

- Convening and enabling industry-led, private-public partnerships focused on manufacturing innovation and engaging U.S. universities, and
- Designing and implementing an integrated whole of government advanced manufacturing initiative to facilitate collaboration and information sharing across federal agencies.

National Network for Manufacturing Innovation

<http://www.manufacturing.gov/nnmi.html>

The NNMI, a proposed national network of up to 45 institutes, will bring together companies, universities and community colleges, and government to develop world-leading technologies and capabilities that U.S.-based manufacturers can apply in production. As self-sustaining hubs, these institutes will create, showcase, and deploy new capabilities, new products, and new processes that can impact commercial production. They will build workforce skills at all levels and enhance manufacturing capabilities in companies large and small. Presently there are four NNMI funded by reallocating existing Agency resources, three by DOD (additive manufacturing, modern metals, digital manufacturing) and one by DOE (power electronics). Funding for the NNMI was included in the FY2015 Opportunity, Growth, and Security Initiative (as well as the prior two budget submission in 2013 and 2014). Independent of the 2015 request, the Administration has committed to five new Institutes, emanating from the Departments of Defense, Energy (Advanced Composites Manufacturing Innovation Institute, DE FOA 0000977 and an RFI for Clean Energy Manufacturing topics, DE-FOA-0001122), Agriculture (Biomanufacturing Innovation Institute, in the USDA budget request), and possibly NASA. The NNI participating agencies are examining the possibility for a nanomanufacturing NNMI. (See NIST Charts 15-17)

Advanced Manufacturing Technology Consortium (AMTech)

<http://www.nist.gov/ampo/>

Convene key players on eliminating critical barriers to innovation, increasing efficiency of domestic innovation efforts, and collapsing the time scale to deliver new products and services based on scientific and technological advances. The program provides funding to industry-led consortia for the development of detailed roadmaps of long-term research challenges. Further, the program will provide cost-shared funding to consortia to support the research needed to help them achieve future desired technology developments. In FY 2015, each planning awardee is expected to produce a technology roadmap (or be on a short term track to complete), which reflects the needs of consortia members representing industry, small business, and other stakeholder groups. (See NIST Chart 13)

Education

SURF: Summer Undergraduate Research Fellowships

<http://www.nist.gov/surfgaithersburg/>

NIST provides funding for approximately 150 summer research fellowships. The fellowships are for undergraduate students majoring in any of the science, technology, engineering or mathematics areas. Supported by the National Science Foundation, the program provides 11 weeks of paid stipend and gives young scientists and engineers an opportunity to work in the NIST research laboratories alongside world leading experts in science and technology. Positions are available at both Gaithersburg, Md. and Boulder, Colo. from late May through early August.

Graduate Student Measurement Science and Engineering (GMSE) Fellowship Program

This program provides approximately \$100-300K for up to three years, subject to available funds. This program will provide financial support to doctoral-level graduate students to work in collaboration with researchers at NIST laboratories in Gaithersburg, Md.; Charleston, S.C.; or Boulder, Colo. Full details of the program, including eligibility requirements, restrictions, the nature of the anticipated awards, the application process and proposal evaluation criteria have been posted in Federal Funding Opportunity (FFO) 2013-NIST-GMSE-01, which solicits a partner to manage the program. There has been no subsequent announcement; but, the NIST Center for Nanoscale Science and Technology (CNST) does support graduate student use of CNST facilities.

National Initiative for Cybersecurity Education (NICE)

<http://csrc.nist.gov/nice/>

In FY 2013, NIST took on the co-chair role in the Office of Personnel Management led Cross-Agency Priority Goal: Closing Skills Gaps in the Federal Cybersecurity Workforce to Improve Mission Performance. As part of its outreach role, members of the NIST NICE Leadership Team continue to attend events, symposia, forums, competitions, educational outreach meetings, and workshops across the country highlighting the strategic goals of NICE and describing activities supporting those goals.

Resources

[Website showing the program opportunities for academia, including sign-up for email alerts:](http://www.nist.gov/director/ocfo/grants/grants.cfm)

<http://www.nist.gov/director/ocfo/grants/grants.cfm>

For access to the information on the Research Advancement's Central Desktop website **Mission Agency Program Site (MAPS)**, contact NLWalker@usc.edu for user name and password.

The MAPS site has:

Under “Wiki” Tab - how to use the site

Under “Files/Discussion” Tab

Mission Agency (DHS, DOD, DOE, DoEd, EPA, NASA, NIST, NOAA, USDA and cross-agency programs in Adv Manuf, Sustainability, STEM Education)

Guide to Agency (NIST) Funding for FYXX

Agency Research Program Charts

Agency Planning Documents

Program Officer Data sheets (with contact info, biosketch, program descriptive, personal pubs)

Program Officer presentations (when available)

Under “Database” Tab

USC MAPS - table of listed agency program officers / programmatic interest

The file labeled “Agency (NIST) Program Charts” at the Central Desktop MAPS website provides a compilation of numbered charts with detailed information on the various NIST funding offices and their various program interests. The Chart numbers in the text above refer to that file.

If you are interested in exploring an opportunity, contact with the appropriate NIST program officer is strongly recommended; see MAPS and/or Murday for Program Officer data sheets.

Assistance in Locating Funding and Preparing Proposals

Dr. James S. Murday DC Office of Research Advancement

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Table 1: FY2010 and FY2012 NIST Research Funding (\$M)

	2010		2012	
	<u>Basic</u>	<u>Applied</u>	<u>Basic</u>	<u>Applied</u>
TOTAL at Universities (NSF does not provide discipline funding breakouts for NIST)	34	48	27	41
TOTAL NIST	197	457	186	497
Physical Sciences	141	108	119	92
Astronomy	-	0		
Chemistry	24	31		
Physics	116	76		
Other	1	1		
Environmental Sciences	0	1	0	4
Atmospheric		1		
Geological		-		
Oceanology		0		
Other		-		
Mathematics and Computer	27	95	33	130
Computer Sciences	4	91		
Mathematics	2	2		
Other	22	2		
Engineering	18	242	22	257
Aeronautical	0	0		
Astronautical	0	-		
Chemical	1	8		
Civil	0	43		
Electrical	10	68		
Mechanical	0	7		
Metal/Materials	1	69		
Other	7	46		
Life Sciences	10	2	11	6
Agriculture	0	0		
Biological	10	2		
Environmental	-	0		
Medical	0	0		
Other	0	0		
Psychological	0	0	0	0
Social Sciences	0	1	-	2
Other Sciences	2	8	1	6

From NSF "Federal Funds for Research and Development: FY2010-2012" NSF 13-326, July 2013

Basic	2010	Tables 27, 31 and 65-71
Applied Research	2010	Tables 38, 42 and 45-48
Basic	2012	Table 29, 33 and 67
Applied Research	2012	Table 40, 44 and 75

Table 2: Submitted FY2015 NIST Budget (\$M) Available to Universities

	Program	FY13 Actual (\$M)	FY14 Est (\$M)	FY15 Req (\$M)
	Scientific and Technical Research and Services (STRS) Budget Line	579	651	680
	NIST Centers of Excellence	0	20	?
	Extramural grants	34	22	?
	Industrial Technology Services (ITS) Budget Line	134	143	161
	AMTech	11	15	15
	Manufacturing innovation Inst Coordination	-	-	5
	NNMI in Opportunity, Growth, and Security Initiative Budget Line			2400

Appendix 1: New Project or Significant Growth in FY2015

University Center of Excellence

<http://www.nist.gov/coe/>

NIST intends at least one new competition for a University-based Center of Excellence in 2014. The topic is yet to be determined. Another two Centers are planned.

National Network for Manufacturing Innovation (NNMI) 0 in FY2014 to \$2.4B

Note that prior requests of \$1B for the NNMI in the NIST budget have not been approved by Congress. But also note that independent of those requests, the Administration has committed to five new Institutes, emanating from the Departments of Defense, Energy (Advanced Composites Manufacturing Innovation Institute, DE FOA 0000977 and an RFI for Clean Energy Manufacturing topics, DE-FOA-0001122), Agriculture (Biomanufacturing Innovation Institute, in the USDA budget request), and possibly NASA. The NNI participating agencies are examining the possibility for a nanomanufacturing NNMI.

The President's Budget includes an increase of \$2.4 billion in appropriations via the Opportunity, Growth and Security Initiative to strengthen the U.S. manufacturing sector through collaborative investments in a network of some 45 manufacturing innovation institutes to address industrially-relevant manufacturing challenges with broad applications and mature emerging technologies and their manufacturing readiness. This would create a National Network for Manufacturing Innovation (NNMI) that will:

- Induce industry and non-federal co-investment to rapidly seize innovation opportunities that lead to industrial capabilities
- Promote direct collaboration on industry-relevant research and development to address emerging technology areas where market failures are causing U.S. innovations to be scaled and manufactured elsewhere
- Facilitate the adoption of new manufacturing technologies, tools, and methodologies that will make U.S. manufacturers more competitive
- Support identification and diffusion of "best practice" approaches to governance structure, IP management, partnering, facilities access, etc.

FFDRC

Solicitation number SB1341-14-RP-0005

<https://www.fbo.gov/spg/DOC/NIST/AcAsD/SB1341-14-RP-0005/listing.html>.

The Federally Funded Research and Development Center (FFRDC) will provide scientific and engineering support needed to carry out the research and engineering agenda set by NIST. This will include engaging in, assisting, and contributing to the support of scientific activities and projects for developing practical cybersecurity solutions composed from commercial components; and performing and engaging in research, engineering, and technology transfer/integration services for trustworthy information systems to the U.S. Government.

Appendix 2: Example Program Officer Data Sheet

Dr. Laurie E. Locascio

NIST Material Measurement Lab
 Chief, Biochemical Science Division
 (301) 975-2629
locascio@nist.gov.

Biosketch:

Dr. Laurie E. Locascio is the Chief of the Biochemical Science Division within the Chemical Science and Technology Laboratory, National Institute of Standards and Technology. In this position, she oversees a research portfolio that includes measurements and standards for forensic DNA analysis, DNA and RNA microarrays, tissue engineering, biological applications of microfluidics, DNA damage and repair, biosecurity, nanomaterial toxicity, flow cytometry, cellular biometrology, fluorescence and Raman analysis, biomarker identification, structural biology, biofuels, and genetically modified organisms.

Education

B.Sc. in Chemistry from James Madison University
 M.Sc. in Bioengineering from the University of Utah
 Ph.D. in toxicology from the University of Maryland at Baltimore medical school

Program: Measurement Science and Engineering (MSE) Research Grant Programs

2012-NIST-MSE-01

The primary objective is to collaborate or conduct research consistent with division programs in nucleic acid chemistry, structure, sequencing, molecular interactions; protein structure, activity, molecular interactions; cellular and molecular imaging and analysis; and bioanalytical, biomanufacturing and bioprocessing measurements.

Illustrative Papers Reflecting Personal Research Interests:

A robust diffusion-based gradient generator for dynamic cell assays
 Atencia Javier; Cooksey Gregory A.; Locascio Laurie E.
 LAB ON A CHIP 12(2), 309-316 2012

Microfluidic-assisted lipid nanotube formation and manipulation with light
 Locascio LE; Brazhnik K; Vreeland W; et al.
 ROYAL SOCIETY OF CHEMISTRY SPECIAL PUBLICATIONS 296, 399-401 2005

Microfluidic mixing
 Locascio LE
 ANALYTICAL AND BIOANALYTICAL CHEMISTRY 379(3), 325-327 JUN 2004

Microfluidic temperature gradient focusing
 Ross D; Locascio LE
 ANALYTICAL CHEMISTRY 74(11), 2556-2564 JUN 1 2002

Appendix 3: Acronym Glossary

Agency Specific

ADLP	Associate Director for Laboratory Programs
AMNPO	Advanced Manufacturing National Program Office
AMP	Advanced Manufacturing Program
AMTech	Advanced Manufacturing Technology Consortium
ARRA	American Recovery and Reinvestment Act of 2009
CNST	Center for Nanoscale Science and Technology (NIST)
EL	Engineering Laboratory (NIST)
FFO	Federal Funding opportunity
GMSE	Graduate Student Measurement Science and Engineering (Fellowship)
IMI	Institute for Manufacturing Innovation
ITL	Information Technology Laboratory (NIST)
ITS	Industrial Technology Services
MML	Materials Measurement Laboratory (NIST)
MSE	Measurement Science and Engineering
NCCoE	National Cybersecurity Center of Excellence
NCNR	NIST Center for Neutron Research
NCGP	NIST Construction Grant Program
NICE	National Initiative for Cybersecurity Education
NNMI	National Network for Manufacturing Innovation
NPO	National Program Office
OSP	Office of Special Programs (NIST)
PMGP	Precision Measurement Group Program
PML	Physical Measurement Laboratory (NIST)
RD&D	Research, Development and Demonstration
SME	Small and Medium sized enterprise
SRC	Semiconductor Research Corporation
SSG	Standards Services Group (NIST)
STRS	Scientific and Technical Research and Services (NIST budget line)
SURF	Summer Undergraduate Research Fellowships
TIP	Technology Innovation Program
NSTIC	National Strategy for Trusted Identities in Cyberspace
WIN	Wireless Innovation Fund

General

BAA	Broad Agency Announcement
CFDA	Catalog of Federal Domestic Assistance Number
CMOS	Complementary Metal Oxide Semiconductor (electronics)
DHS	Department of Homeland Security
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DoEd	Department of Education (alternative)
DoI	Department of Interior
ED	Department of Education
EPA	Environmental Protection Agency

FDA	Food and Drug Administration
FFO	Federal Funding Opportunity
FFDRC	Federally Funded Research and Development Center
FY	Fiscal Year
HTM	Hierarchical Temporal Memory
IHE	Institutions of Higher Education
IMI	Institute for Manufacturing Innovation
MAPS	Mission Agency Program Summary (provided by USC Res. Adv.)
MEMS/NEMS	Micro- Nano-ElectroMechanical Systems
MRL	Manufacturing Readiness Level
NASA	National Aeronautics and Space Administration
NDI/E	Non-Destructive Inspection/Evaluation
NIST	National Institute for Standards and Technology (in DOC)
NNMI	National Network for Manufacturing Innovation
NOAA	National Oceanic and Atmospheric Administration (in DOC)
NRI	Nanoelectronics Research Initiative
NSF	National Science Foundation
NTIA	National Telecommunications and Information Administration
OMB	Office of Management and Budget
OPM	Office of Personnel Management
PBR	President's Budget Request (submitted to Congress)
PCAST	President's Council of Advisors on Science and Technology
PTSD	Post-traumatic Stress Syndrome
RDT&E	Research, Development, Test and Evaluation
RF	Radio-frequency
RFA	Request for Application
SBIR	Small Business Innovative Research
S&T	Science and Technology
STEM	Science, Technology, Engineering and Mathematics (education)
TBA	To be announced
TBI	Traumatic Brain Injury
TRL	Technology Readiness Level
USDA	US Department of Agriculture