FLC

Federal Laboratory Consortium
for Technology Transfer

2019

ANNUAL REPORT

TO THE PRESIDENT AND CONGRESS

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I. FLC ORGANIZATION

The Federal Laboratory Consortium for Technology Transfer (FLC) is the formally chartered, nationwide network of over 300 federal laboratories, agencies and research centers that fosters commercialization best-practice strategies and opportunities for accelerating federal technologies out of the labs and into the marketplace.

Through American taxpayers' investment in our federal laboratories' research and development (R&D) efforts, scientific and technological breakthroughs can take place and return dividends to our economy. The new industries, businesses and jobs that can be created when a new technology is brought to market are just a few of the successes that take effect through technology transfer (T2), and the FLC is here to promote, facilitate and educate labs and industry about that process.

The FLC spent much of fiscal year 2019 (FY19) refining a five-year Strategic Plan. This process led to a November 2019 cooperative agreement with AUTM, a nonprofit leader supporting the development of academic technology transfer and research that changes the world and drives innovation forward. For more information on AUTM, visit **www.autm.net**.

BIGGER PICTURE

GLOBAL POSITIONING SYSTEM TECHNOLOGY

The impacts of technology transfer facilitated by the FLC and its members often take years to realize. This report includes snapshots of published analyses, prepared by independent organizations, that illustrate these impacts.

Report title: *Economic Benefits of the Global Positioning System*
Prepared by: RTI International
Relevant agency or agencies: Multi-agency

KEY FINDINGS:
- $1.4 trillion in economic benefits
- More than $1 billion per day

REFERENCE: O'Connor AC, Gallaher MP, Clark-Sutton K, et al. Economic Benefits of the Global Positioning System (GPS). Research Triangle Park, NC: RTI International report number 0215471; June 2019. Available at: https://www.nist.gov/system/files/documents/2020/02/06/gps_finalreport618.pdf

II. LETTER FROM THE FLC CHAIR

Partnerships are the key to successful technology transfer programs, and FY19 marked some changes for the Federal Laboratory Consortium (FLC), including laying the foundation for a new partnership. In FY19, the Executive Board developed an ambitious Strategic Plan to guide the organization for the next five years. The main thrust of this plan is to focus the FLC's strategic efforts into three main pillars: Promote, Educate and Facilitate. These areas support federal technology transfer through communication, education and partnerships, respectively. The FLC continues to support science and technology policies as defined by the Cross-Agency Priority (CAP) Goal focused on Lab-to-Market transitions in the President's Management Agenda.

As Chair of the FLC, I work with many labs and learn best practices for engaging partners and building meaningful relationships to move federal innovation out of the labs and into the marketplace. The work that the FLC does is an enormous asset to the country. Our mission guides all that we do to benefit the U.S. economy, national security and society.

Through our communications, meetings and educational offerings, the FLC celebrates the successes and innovation that come out of our federal labs. In FY19, 30 awards in eight categories were given to project teams representing seven agencies, chosen from 97 nominations (see page 6). The variety of innovation among the different agencies demonstrates that federal T2 is the incubator of new products, medicines, supplies and solutions that keep the U.S. at the forefront of global inventions and discovery.

We are committed to supporting our member labs and providing the tools and services they need to achieve their missions. Our work with the FLC Business platform benefits the user and the laboratory representative in managing their available resource data (see page 14). We added 21 new technologies to LabTech in Your Life (see page 7), our promotional campaign highlighting successful innovations that permeate our everyday lives, and our annual FLC Planner received 94 photo submissions (see page 8). These products and tools promote lab success to a broader audience, showing the value of federal research and development and inspiring future collaborations.

Year after year, the T2 community engages partnerships benefiting research, innovation and public health, leading to greater value for the next generation. We are excited to move forward with our 2020-25 Strategic Plan and build a path for positive change. In addition, the FLC will begin to work with a cooperative partner in FY20 to achieve the goals laid out in the Strategic Plan. This new partner, AUTM, is the leading technology transfer association for the academic community. AUTM and the FLC have many shared interests and educational programs, and a partnership will help both organizations grow and thrive, much like the successful technology transfer partnerships involving federal labs.

This annual report outlines the efforts that our organization continues to make to serve our members, partners and collaborators. In accordance with 15 USC Section 3710(e)(6) and on behalf of the members of the FLC, I am pleased to present the FLC 2019 Annual Report to the President and Congress.

Respectfully,

John Dement, FLC Chair

III. 2019 BY THE NUMBERS

FEDERALLABS.ORG VISITORS

419,535
PAGE VIEWS

MOST VISITED PAGES

FLC BUSINESS	CAREERS	EVENTS
9,976 page views	**6,849** page views	**2,441** page views

FLC EVENTS

NATIONAL MEETING

434 Attendees	**236** Trainees
182 Newcomers	**7** Exhibitors/ Sponsors

REGIONAL MEETINGS: 4

SOCIAL MEDIA

1,136 Facebook likes	**2,924** Twitter followers
940 LinkedIn followers	**285** YouTube subscribers

SUCCESS STORIES GALLERY

41
SUCCESS STORIES

LABTECH IN YOUR LIFE

48
TECHNOLOGIES

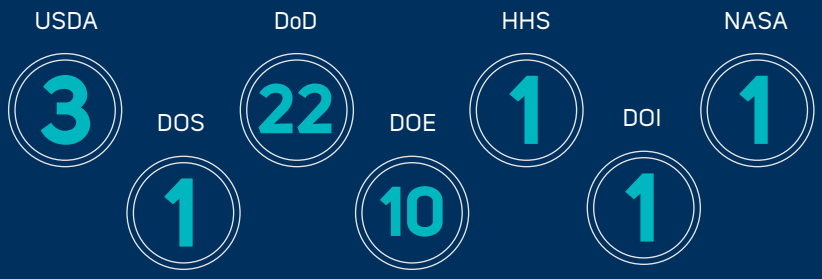
NATIONAL AWARDS

8	97	30	7
Categories	Nominations	Winners	Agencies Represented

WINNERS BY REGION

**Multiple agencies and regions are represented in the interagency partnership category, so the total does not match the number of winning entries.*

WINNERS BY AGENCY



IV. PROMOTING FEDERAL TECHNOLOGY TRANSFER

Promoting federal laboratories' technology transfer is essential to maximizing the positive impact of those partnership-driven innovations on the U.S. economy, national security and society.

2019 FLC NATIONAL AWARDS

Each year, the FLC honors outstanding technology transfer achievements through its prestigious awards program. The National Awards program helps to promote federal T2 on multiple levels. Teams that submit projects for consideration typically draw attention to their achievements within their lab, regardless of whether they win an award. Winners are feted by the FLC community in a ceremony at the National Meeting and in the accompanying Awards Publication. The FLC also promotes National Award winners to state and local government entities and mainstream media outlets, which further raises tech transfer's profile with prospective partners and the public.

In FY19, the FLC received 97 nominations in eight categories. Thirty awards were distributed across seven agencies to honor these remarkable achievements for the technology transfer profession.

The 2019 FLC National Awards Ceremony took place on April 24 in Orlando, Florida, as part of the National Meeting. Meeting attendees also had the opportunity to view posters created by the award winners to provide more details about their work. The ceremony was filmed and a video was produced to showcase the honorees and provide a glimpse into this prestigious event honoring some of the nation's finest researchers, scientists and entrepreneurs. The video was shared with the agencies to promote the innovation and success coming out of federal labs to a broader audience.

BIGGER PICTURE

DoD TECHNOLOGY TRANSFER

Report title: *Value Proposition of the Department of Defense Technology Transfer Program*
Prepared by: American Association for the Advancement of Science
Relevant agency or agencies: Department of Defense

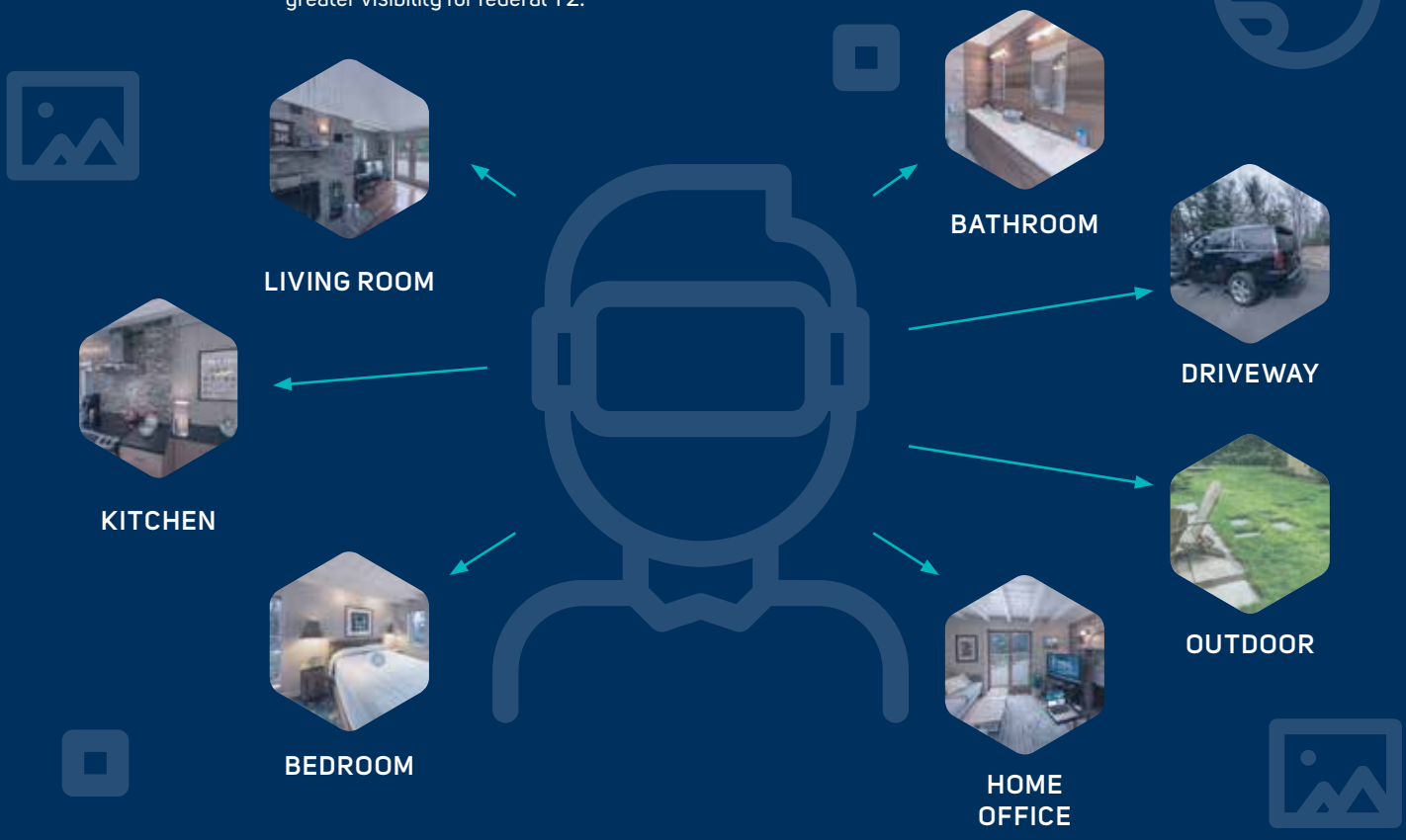
KEY FINDINGS:
- Numerous case studies
- Examples of marketed products

REFERENCE: Steinbacher JL, Soule EE. Value Proposition of the Department of Defense Technology Transfer Program. Prepared by American Association for the Advancement of Science, 2019. Available at: https://federallabs.org/media/publication-library/dod-value-study

See page 3 for more information

LABTECH IN YOUR LIFE

In FY19, the FLC continued to promote technology transfer success stories through its LabTech in Your Life program. This virtual environment, showing the benefits of federal lab innovations that permeate our daily lives, was launched in July 2018. In FY19, this virtual platform was used at events throughout the country to promote technology transfer and the value of research and development. In addition, the number of technologies featured in the program was nearly doubled, from 27 to 48, to create even greater visibility for federal T2.



The viewer journeys through a home with stations highlighting familiar products derived from federal lab innovations — from mobile cameras by NASA in the living room to diapers by the Department of Energy's Los Alamos National Laboratory in the bathroom. This creative interactive journey educates the viewer while promoting the successes of federal lab research and development. In 2019, one new tour stop (the driveway) was added outside of the home, while new technologies were added to the tour stops inside.

This virtual experience has been well received by the T2 community and is a popular marketing tool used during trade shows, roadshows, and conferences. The FLC continues to discuss ways to expand this program, with plans for a new iteration focused on a mass transit venue in FY20.

PROMOTE

BIGGER PICTURE

DoD LICENSE AGREEMENTS

Report title: *National Economic Impacts from DoD License Agreements with U.S. Industry, 2000-2017*
Prepared by: TechLink and University of Colorado, Boulder
Relevant agency or agencies: Department of Defense

KEY FINDINGS:
- $27 billion in sales of new products and services from DoD license agreements
- $4.5 billion in sales of new products to the U.S. military
- $58 billion in total economic impact nationwide
- $6 billion in new tax revenues (federal, state, and local)
- 214,791 jobs (11,933 per year) with average compensation of $74,762

REFERENCE: National Economic Impacts from DoD License Agreements with U.S. Industry, 2000-2017. Prepared by TechLink, Bozeman, MT; and Leeds School of Business, University of Colorado, Boulder, CO; 2019. Available at: https://techlinkcenter-assets.s3-us-west-2.amazonaws.com/impact-reports/DoD_Licensing_Study_2018_With_Cover.pdf

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FLC MARKETING AND COMMUNICATION TOOLS

The FLC is committed to supporting its members and partners with the tools and services they need to accelerate their T2 and marketing efforts. Clear and concise communication keeps the flow of information moving smoothly across the organization.

The five-year Strategic Plan developed during FY19 creates a road map for the FLC to move the organization forward to increase awareness and engagement within the federal lab community, prospective partners from industry and academia, and the public.

The reach of FLC promotions was broadened through the social media channels of Facebook, Twitter, LinkedIn and YouTube. These platforms offer a unique space to promote federal lab T2 successes throughout the year.

FLC PUBLICATIONS

The FLC produces several publications, both in print and online, to promote its members' successes to a variety of audiences.

The 2019 National Awards Publication promoted the outstanding achievements of technology transfer to the FLC community. The 2019 Awards Publication was distributed during the 2019 FLC National Awards Ceremony and was very well received by the FLC community.

The FLC Planner is a 14-month calendar featuring large-format photos illustrating federal T2 successes, which provides a visually appealing package to promote those achievements to the FLC community, government offices and the public. The 2020 Planner received 94 photo submissions from member labs, and the judges had a challenging time selecting only 14 to be included in the calendar.

V. EDUCATING TECHNOLOGY TRANSFER PROFESSIONALS

The FLC understands the importance of providing high-quality professional development for the federal technology transfer community. The FLC professional development team and committee members have worked tirelessly to provide the knowledge base necessary for federal T2 professionals to effectively accelerate lab-to-market activities. Our courses, conferences and webinars are focused on providing a well-rounded curriculum to meet the needs of the entire T2 community from novice to expert.

2019 FLC NATIONAL MEETING

The premier event of the year for the federal technology transfer community, the FLC National Meeting, took place from April 23 to 25, 2019, in Orlando, Florida. This year, the National Meeting consisted of five general sessions, four concurrent sessions, multiple region and committee meetings, a robust awards program honoring our nation's finest technology transfer professionals, multiple poster presentations supporting those awards, an FLC Town Hall meeting, and seven exhibitors and sponsors for attendees to visit during meeting breaks.

NATIONAL MEETING STATS

434 ATTENDEES

236 TRAINING DAY ATTENDEES

182 FIRST-TIME ATTENDEES

7 EXHIBITORS/ SPONSORS

TRAINING DAY: APRIL 23, 2019

The 2019 National Meeting kicked off with a full day of technology transfer training courses designed to educate professionals on a range of T2 topics, from basic knowledge to advanced negotiation skills.

TRAINING DAY STATS

Technology Transfer for Beginners: **41 ATTENDEES**

Intellectual Property for Technology Transfer Professionals: **36 ATTENDEES**

CRADA (Cooperative Research and Development Agreement) Workshop: **44 ATTENDEES**

Licensing and Negotiation Workshop: **30 ATTENDEES**

AMA Training – Developing Your Staff Through Teaching: **24 ATTENDEES**

Strategic T2 – Engaging the External Ecosystem: **37 ATTENDEES**

Technology Valuation & IP Portfolio Management: **24 ATTENDEES**

NATIONAL MEETING GENERAL SESSIONS: APRIL 24-25, 2019

OPENING KEYNOTE. The 2019 keynote speaker, Dr. Walter G. Copan, Under Secretary of Commerce for Standards and Technology and Director of the National Institute of Standards and Technology (NIST), has had a distinguished career as a science and technology executive in large and small corporations, nonprofits, the U.S. government and other public-sector settings. Through his high-level oversight and direction for NIST and current science and technology policy, Copan offered a valuable perspective on lab-to-market efforts to share with the technology transfer community, including an announcement of the NIST Green Paper's publication.

AUVSI PANEL. This panel was composed of industry members of the Florida chapter of the Association for Unmanned Vehicle Systems International (AUVSI). Panelists shared their perspectives on technical challenges being addressed by their companies for which federal laboratories might have solutions. Autonomous systems are a Technology Focus Area for the FLC, and AUVSI is a potential "bridge organization" between federal labs and the unmanned/robotics industry sector. It is the world's largest nonprofit organization devoted exclusively to advancing the unmanned systems and robotics community.

LAB DIRECTOR'S FORUM. The 2019 FLC Laboratory Director of the Year Award recipient, Dr. Larry Clark of the U.S. Department of Agriculture's National Wildlife Research Center (USDA NWRC), was featured in this year's Lab Director's Forum. Since becoming director of the NWRC in 2008, Clark has strived to increase and promote the center's impact as the leading international institution for wildlife damage management research. Under his direction, technology transfer has become a major focus of the center's outreach efforts.

ROI AND LAB-TO-MARKET NEXT STEPS. During this popular session, NIST Director Walter G. Copan discussed the progress on the Return on Investment (ROI) Green Paper and the status of the proposed initiatives. Dr. Jennifer Shieh, the U.S. Small Business Administration's Chief Scientist and Senior Technology Policy Adviser, presented on the Lab-to-Market CAP Goal and the progress of the National Science and Technology Council (NSTC) workgroup.

NASA KENNEDY SPACE CENTER'S TRANSITION TO THE WORLD'S PREMIER MULTI-USER SPACEPORT. The National Aeronautics and Space Administration's (NASA) Kennedy Space Center (KSC), the world's premier multi-user spaceport, is shared by government, academia and commercial partners. FLC attendees learned how KSC, in only eight years, transformed from a government-only, single-user launch complex to a multi-user spaceport supporting four separate human space flight development efforts — unmatched anywhere else in the world.

2019 FLC REGIONAL MEETINGS

The FLC continues to have a robust regional program delivering content tailored to the needs of various economic ecosystems across the country. In the fall of 2019, four regional meetings were held: the Mid-Atlantic Region; the combined Mid-Continent and Far West regions; the combined Midwest and Southeast regions; and the Northeast Region.

FLC Northeast Region

NORTHEAST REGION | *Sept. 24-25, Newport, Rhode Island*
The Northeast Region Meeting was hosted by Innovate Newport and the Naval Undersea Warfare Center, Division Newport (NUWC Newport).

Presentations focused on collaborations between federal labs and external organizations through Partnership Intermediary Agreements, state and regional economic agencies, and novel mechanisms.

The event was held at the newly opened Innovate Newport, a historic school building in the heart of Newport that has been transformed into a hub for the region's growing innovation economy.

Tours of NUWC Newport's unique facilities were also provided.

FLC Midwest Region

FLC Southeast Region

MIDWEST/SOUTHEAST REGIONS | *Oct. 15-17, Milwaukee, Wisconsin*
The FLC's Midwest and Southeast regions met to promote, educate and facilitate technology transfer for regional members and their academic and private-sector partners. Hosting the meeting close to research hubs, such as The Water Council, highlighted the importance of technology transfer in economic and technological growth. The 2019 meeting offered multiple opportunities to learn about FLC initiatives such as the Technology Focus Areas, strategic planning results, and upcoming organizational changes.

The meeting also provided a great opportunity to network with colleagues from other labs and with individuals from The Water Council's member companies. Our Midwest and Southeast regional laboratories conduct leading science and technology R&D every day to advance their agency missions and benefit our nation's welfare. These accomplishments were celebrated during the Regional Awards event, highlighting the T2 work taking place in the Midwest and Southeast that has set an example for other regions.

BIGGER PICTURE

DoD CRADAS

Report title: *National Economic Impacts from Department of Defense CRADAs. Pilot Study, 2019.*
Prepared by: TechLink and University of Colorado, Boulder
Relevant agency or agencies: Department of Defense

KEY FINDINGS:
- $8.7 billion in sales of new products and services from DoD CRADAs
- $4.9 billion in sales of new products to the U.S. military
- More than $23 billion in total economic impact nationwide
- Nearly $3 billion in new tax revenues (federal, state, and local)
- 118,929 jobs (6,607 per year) with average compensation of $75,292

REFERENCE: National Economic Impacts from Department of Defense CRADAs. Pilot Study, 2019. Prepared by TechLink, Bozeman, MT; and Leeds School of Business, University of Colorado, Boulder, CO; August 2019. Available at: https://techlinkcenter-assets.s3-us-west-2.amazonaws.com/impact-reports/DoD-CRADA-Pilot-Study.pdf

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2019 FLC REGIONAL MEETINGS (CONTINUED)

MID-ATLANTIC REGION | *Nov. 5-6, Rockville, Maryland*

The theme of the Mid-Atlantic Region Meeting was "Building Bridges and Infrastructure to Support the Federal T2 Mission." The popular panels and speakers included Professor Dean Alderucci, JD, director of the Carnegie Mellon University Center for Artificial Intelligence (AI) and Patent Analysis, who spoke about how AI platforms can support T2 efforts.

Other "bridge-building" sessions included:

- Building State and Local Economic Development Bridges with Federal Labs and the Private Sector
- Building Organizational Bridges between the Private Sector, the Academic Community and Federal Labs
- Building Bridges between Individuals in both Federal Labs and the Private Sector
- Building T2 Career Bridges for Workforce Development
- Building Bridges Within Federal Labs Among Personnel
- Building Communication Bridges to Relate Importance of T2 to the "General" Public

MID-CONTINENT/FAR WEST REGIONS | *Nov. 5-7, Livermore, California*

The Mid-Continent/Far West joint meeting featured sessions, topics and training to strengthen and enhance the technology transfer mission of the FLC. Attendees also had the opportunity to tour the Lawrence Livermore National Laboratory campus.

Sessions included:

- Keynote Speaker: Dr. William Goldstein, director of the Lawrence Livermore National Laboratory
- Diversity and Inclusion in the Lab and Tech Transfer Community
- DOE's New Lab Partnering Service
- Biotechnology Development and Protection
- Regional Success Stories
- Using SBIR (Small Business Innovation Research) to Enhance T2
- Mid-Continent and Far West Awards Dinner and Celebration

ONLINE EDUCATION OFFERINGS

The FLC continues to enhance its online educational offerings to provide convenient professional development opportunities for all levels of technology transfer professionals throughout the year.

In 2019, the FLC's online education offerings included:

- More than 70 videos
- 13 online courses
- 14 webinars
- 49 reference materials, training events and resources

These educational topics included:

- Trade secrets
- Patents
- Intellectual property
- Trademarks
- Copyrights
- FLC tools and resources
- New T2 regulations

VI. FACILITATING TECHNOLOGY TRANSFER ACTIVITY

The FLC Strategic Plan developed in 2019 includes a Facilitate pillar, with a mission to proactively engage and leverage partnerships that connect relevant private-sector partners with individual federal laboratories to increase measurable outcomes.

In 2019, facilitation of technology transfer was achieved by updating and upgrading FLC Business into its 3.0 stage, continuing work on the autonomous systems Technology Focus Area, and various regional events designed to generate partnerships.

EFFORTS TO SPARK LAB-TO-MARKET ACTIVITY

- The FLC National Meeting in April 2019 included a panel focused on how working with Manufacturing USA and the Manufacturing Extension Partnership (MEP) National Network can lead to increased T2 opportunities.

- Throughout 2019, the FLC's regional officers participated in supporting the Small Business Administration's (SBA) Small Business Innovation Research (SBIR) Road Tour — including an all-day event in San Juan, Puerto Rico, on Nov. 15, the same day as the SBIR Road Tour's stop in that location. The tour travels across the country helping to connect entrepreneurs working on advanced technologies to the SBA's SBIR and STTR (Small Business Technology Transfer) programs and opportunities for early-stage funding.

BIGGER PICTURE

MATERIALS GENOME INITIATIVE

Report title: *Economic Analysis of National Needs for Technology Infrastructure to Support the Materials Genome Initiative*
Prepared by: RTI International
Relevant agency or agencies: Multi-agency

KEY FINDING:
• Economic benefit of up to $270 billion annually

REFERENCE: Scott T, Walsh A, Anderson B, O'Connor A, Tassey G. Economic Analysis of National Needs for Technology Infrastructure to Support the Materials Genome Initiative. Research Triangle Park, NC: RTI International report number 0215231; April 2018. Available at: https://www.nist.gov/system/files/documents/2020/02/06/MGI%20Final%20Report.pdf
See page 3 for more information

FACILITATE

BIGGER PICTURE

ADVANCED ENCRYPTION STANDARD

Report title: *The Economic Impacts of the Advanced Encryption Standard, 1996-2017*
Prepared by: RM Advisory Services LLC
Relevant agency or agencies: Department of Commerce

KEY FINDING:
• Net present value of more than $250 billion

REFERENCE: Leech DP, Ferris S, Scott JT. The Economic Impacts of the Advanced Encryption Standard, 1996-2017. Gaithersburg, MD: National Institute of Standards and Technology; September 2018. Available at: https://nvlpubs.nist.gov/nistpubs/gcr/2018/NIST.GCR.18-017.pdf
See page 3 for more information

FLC BUSINESS 3.0

The third major round of updates on the FLC Business tool was successfully launched in 2019. The tool allows users to tour the capabilities of FLC Business, find detailed information on labs, and easily find contact information for laboratory representatives. The option to publish a Notice of Intent to License section was added, allowing labs to describe proposed exclusive licenses of available technologies and providing the public with the opportunity to comment.

TECHNOLOGY FOCUS AREA INITIATIVE

Now in its fourth year, the TFA program has been working to gain traction with industry representatives in the T2 space.

- Autonomous Systems TFA: Association for Unmanned Vehicle Systems International panel discussion at the 2019 National Meeting (see page 10 for more details)
- Energy TFA: Technology Focus category in the 2019 FLC National Awards, won by Idaho National Laboratory for its T2 work with Cogent Energy Systems

TFA AWARD SPOTLIGHT:
IDAHO NATIONAL LABORATORY AND COGENT ENERGY SYSTEMS

Large waste-to-energy (WTE) facilities have existed for decades, but technology that allows for economic recovery of energy from waste on a small scale has remained elusive. At Idaho National Laboratory (INL), a Department of Energy laboratory, research on the creation of nanoparticles evolved into the core of a gasifier for WTE applications, turning biomass or virtually any waste into usable products at a small scale. This technology was transferred to Cogent Energy Systems of Merrifield, Virginia, where it was commercialized as the HelioStorm Gasifier. Since its founding, the company has been awarded a succession of grants from the Department of Energy (DOE), INL, the U.S. Navy, and the National Renewable Energy Laboratory. In partnership with these organizations and Creare, an engineering research and development firm in Hanover, New Hampshire, Cogent has developed and demonstrated two full-scale waste-to-energy gasifiers, with plans for a complete end-to-end commercial demonstration system in 2019.

VII. FINANCIAL STATEMENT

By statute (15 USC 3710[e] [7]), the FLC receives its funding as a stated percentage of the intramural research and development budget of each federal agency for the fiscal year. These funds are transferred to the National Institute of Standards and Technology (NIST) at the beginning of each fiscal year and then transferred by NIST to the FLC to conduct its activities.

AGENCY CONTRIBUTIONS TO THE FLC FOR FISCAL YEAR 2019

AGENCY	AMOUNT PAID
Department of Agriculture	$123,464
Department of Commerce	$91,648
Department of Defense	$1,416,392
Department of Energy	$782,344
Department of Health and Human Services	$619,160
Department of Homeland Security	$38,080
Department of the Interior	$60,568
Department of Transportation	$28,512
Department of Veterans Affairs	$59,032
Environmental Protection Agency	$20,408
National Aeronautics and Space Administration	$356,744
National Science Foundation	$16,480
Total	**$3,612,832**

SCHEDULE OF REVENUES AND DISBURSEMENTS

Revenues	$3,683,144
Disbursements	$3,529,510
Contract Support	$3,175,751
NIST Administrative Charges	$235,000
Paid by NIST	$118,759

Federal Laboratory Consortium
for Technology Transfer

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