2020 FLC NATIONAL MEETING AWARDS

FLC

Federal Laboratory Consortium
for Technology Transfer

Message From the Awards Committee Chair

EXCELLENCE IN TECHNOLOGY TRANSFER AWARDS

Department of Agriculture

Department of Defense - U.S. Army

Department of Defense - U.S. Air Force

Department of Energy

Department of Health and Human Services

Department of Health and Human Services – National Institutes of Health

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INDIVIDUAL AND TEAM AWARDS

Interagency Partnership Award

State and Local Economic Development Award

Impact Award

Technology Transfer Innovation Award

Technology Focus Award

Rookie of the Year Award

Outstanding Technology Transfer Professional Award

Laboratory Director of the Year Award

FLC Service – Harold Metcalf Award

2019 Regional Award Winners

Awards Committee Acknowledgment

2021 FLC Awards Program Calendar

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WELCOME

TO THE 2020 FLC NATIONAL AWARDS

We are thrilled to present this year's showcase of outstanding federal technology transfer efforts, which represent some of the best examples of the many innovative collaborations that define the FLC.

Because federal technology transfer is always changing, the FLC awards program also needs to change at times in our quest to recognize the excellent work being done by technology transfer professionals. This year, we added two new award categories—the Impact Award and the Technology Transfer Innovation Award.

The response from FLC members was impressive, in terms of both the number of applicants and the quality of the work being described. The evolving nature of technology transfer is also evident in the broad range of T2 mechanisms being employed by the award winners on the path to commercialization.

We look forward to watching the transferred technologies become integral parts of our everyday lives, as so many other federal technologies already have.

The FLC 2020 National Awards are presented in the following categories:

EXCELLENCE IN TECHNOLOGY TRANSFER AWARD
Recognizes employees of FLC member laboratories and non-laboratory staff who have accomplished outstanding work in the process of transferring federally developed technology.

INTERAGENCY PARTNERSHIP AWARD
Recognizes agency and/or laboratory employees from at least two different agencies who have collaboratively accomplished outstanding work in transferring a technology.

STATE AND LOCAL ECONOMIC DEVELOPMENT AWARD
Recognizes successful initiatives that involve partnership between state or local economic development groups and federal laboratories for economic benefit.

IMPACT AWARD
Honors employees of FLC member laboratories and non-laboratory staff whose technology transfer efforts have made a tangible and lasting impact on the populace or marketplace ranging from a local to a global scale.

TECHNOLOGY TRANSFER INNOVATION AWARD
Recognizes federal laboratories that successfully implemented innovative or unconventional technology transfer approaches that resulted in a significant increase in technology transfer activities.

TECHNOLOGY FOCUS AWARD
Presented to a laboratory which has most successfully completed a transfer effort of a featured technology under the initiative for that year. The 2020 award recognizes technology transfer related to autonomous systems.

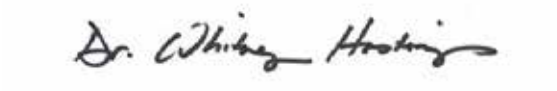
ROOKIE OF THE YEAR AWARD
Recognizes the efforts of an FLC laboratory technology transfer professional with three years (or less) experience who has demonstrated outstanding work transferring a technology in a manner significantly above and beyond what was called for in the normal course of their work.

OUTSTANDING TECHNOLOGY TRANSFER PROFESSIONAL AWARD
Recognizes the efforts of an FLC laboratory technology transfer professional (or team) who has demonstrated outstanding work transferring a technology in a manner significantly above and beyond what was called for in the normal course of their work.

LABORATORY DIRECTOR OF THE YEAR AWARD
Honors a laboratory director who has made maximum contributions to the overall enhancement of technology transfer for economic development.

HAROLD METCALF AWARD FOR FLC SERVICE
Recognizes an FLC employee who has provided sustained significant service to the FLC as an organization.

The FLC awards are a prestigious honor in the technology transfer world, with dozens of nominations submitted each year from more than 300 federal laboratories and their agencies. It is my great pleasure and privilege to present the recipients of the 2020 FLC National Awards.



Dr. Whitney Hastings, Awards Committee Chair

AWARDS

EXCELLENCE IN TECHNOLOGY TRANSFER

USDA Agricultural Research Service

TREATING WASTEWATER GETS CLEANER AND CHEAPER

US Department of Agriculture
Agricultural Research Service

Wastewater management is about to become a lot less smelly, a lot less toxic, and a lot less expensive thanks to technology developed by the Agricultural Research Service for swine farms that is also being adapted for household septic systems.

The odors associated with wastewater treatment are well known. A jury recently awarded more than $50 million to 10 neighbors of a swine farm in Bladen County, North Carolina, partly because of the foul smells coming from the farm's open-air wastewater tanks, called lagoons. But swine lagoons aren't just annoying; they're also a public health hazard. In North Carolina, the Research Triangle Institute estimated that reducing gaseous emissions of ammonia from the state's swine farms by 50% could save $189 million per year because of improvements in human health.

Both the high ammonia concentration typical in livestock wastewater and cold winter temperatures inhibit nitrification (conversion of ammonia to nitrite, which is soluble in water). Conventional methods of promoting nitrification, such as constructing additional treatment tanks or covering the lagoons with plastic, can be very expensive.

ARS scientists isolated a high-performance nitrifying sludge (HPNS) from manure that is effective at high ammonia levels and low temperatures. In addition to oxidizing the ammonia, the process substantially reduces the presence of odor-causing compounds in the wastewater.

The HPNS is introduced via floating media scaffolds, or capping units, which make it possible to treat just the top layer of wastewater rather than all of it. This process is significantly less expensive than the use of plastic lagoon covers or other conventional methods. Covering the lagoons in North Carolina alone would cost more than $320 million; the ARS lagoon capping units would cut that cost by more than half.

ARS signed technology transfer agreements with Pancopia Inc. of Hampton, Virginia, to design and develop next-generation commercial units of the technology, and with Terra Blue Inc. of Clinton, North Carolina, to devise cost-effective ways of retrofitting it for livestock production farms.

In addition to swine lagoons, the technology can be adapted to wastewater lagoons for other types of livestock such as dairy, beef and poultry. The technology transfer process also identified new market segments that could benefit from this technology, such as household septic systems.

Pancopia is planning to incorporate HPNS in household septic tanks in the Chesapeake Bay watershed, at a fraction of the cost of current systems. Maryland will pay up to $13,000 of the cost to replace a septic tank with one that will remove nitrogen; replacing the state's 52,000 critical septic systems could require a $676 million investment. HPNS could cut that cost by two-thirds, saving up to $446 million.

Above: *Bill Cumbie (left) of Pancopia Inc. and Dr. Matias Vanotti of USDA-ARS.* ***Not pictured:*** *Dr. Ariel Szogi, Dr. Thomas Ducey, Gail Poulos*

Above: *Rapid start-up of a nitrification tank in a swine farm in North Carolina using 1 L HPNS bacterial composition in 230 m3 liquid manure.*

ARS IRRIGATION SYSTEM COULD PAY OFF IN BILLIONS

US Department of Agriculture
Agricultural Research Service

The technology transfer efforts of the Department of Agriculture's Agricultural Research Service (ARS) and three industry partners have created a smarter autonomous irrigation system with the potential to increase agricultural revenues by billions of dollars.

The need for irrigation is growing, while the supply of water for irrigation remains limited. Pressurized irrigation systems, mostly of the center pivot variety, are popular in the US and other countries because of their low labor requirements and uniform distribution of water. However, a lack of effective decision support systems for irrigation management means that the crop yield per unit of irrigation water typically is significantly less than could be achieved.

To solve this problem, the ARS partnered with three companies — Valmont Industries of Valley, Nebraska; Dynamax Inc. of Houston; and Acclima Inc. of Meridian, Idaho — to develop and commercialize a proprietary Irrigation Scheduling Supervisory Control and Data Acquisition (ISSCADA) system. (See page 37 for more details about the technologies involved.)

The technology transferred to the industry partners directly responds to the challenges of increased productivity and more efficient water and nutrient use. Valmont is seeing increasing demand for its variable rate irrigation (VRI) center pivot irrigation systems, including in such distant arenas as China and the dairy regions of New Zealand (to control nutrient pollution). The ISSCADA system gives producers the sensor-based decision support system needed to effectively operate both VRI and conventional center pivot systems, and it gives policymakers a means to reduce water consumption and nutrient pollution without reductions in farm productivity and profitability.

Globally, both Acclima and Dynamax sell system components that are used in irrigation management, environmental monitoring and management, and research. Implementation of the ISSCADA system will help these companies further expand their sales and become world leaders in providing sensor systems for these purposes.

In the continental US, there are more than 330,000 center-pivot systems on more than 42 million acres. Retrofitting these with the ISSCADA system could eventually generate manufacturer revenue of more than $5 billion. Using conservative estimates of reduced pumping cost and increased yield, adding ISSCADA to all US center pivots could increase American producers' revenue by about $3 billion per year.

Through increasing producer revenue, efficiency and profitability; raising yield per unit of scarce water resources while conserving water and nutrients; and introducing new products in the US and global marketplace, this T2 effort supports the following four of the seven USDA strategic goals:

- Maximize the ability of American agricultural producers to prosper by feeding and clothing the world.
- Promote American agricultural products and exports.
- Facilitate rural prosperity and economic development.
- Strengthen the stewardship of private lands through technology and research.

Left to right: Dr. Michael Andrade, USDA ARS Plains Area; Dr. Paul Colaizzi, USDA ARS Plains Area; Dr. Steven Evett, USDA ARS Plains Area; Dr. Harry Schomberg, USDA ARS Northeast Area; Dr. Kenneth Stone, USDA ARS Southeast Area; Dr. Ruixiu Sui, USDA ARS Southeast Area; Dr. Susan O'Shaughnessy, USDA ARS Plains Area; Dr. Earl Vories, USDA ARS Midwest Area
***Not pictured:** Dr. Robert Schwartz, USDA ARS Plains Area*

T2 BROADENS USE OF ARMY DECONTAMINANT POWDER

Department of Defense

US Army Combat Capabilities Development Command Chemical Biological Center

First responders and other civilians who interact with toxic materials, including those tasked with cleanup after an opioid overdose, now can neutralize those hazards more easily with a decontaminant powder originally developed by the Army.

A collaborative research team created by the US Army Combat Capabilities Development Command Chemical Biological Center (CCDC CBC) developed and tested the Solid Decontamination (Decon) Blend as part of the laboratory's ongoing search for an easy-to-use product to protect against the harmful effects of chemical and biological agents.

The product, which addresses many of the limitations of liquid decontaminants, was commercialized through multiple technology transfer agreements with a start-up, MQM Solutions Inc. of Cleveland. A patent license agreement (PLA) and a Cooperative Research and Development Agreement (CRADA), both signed in early 2019, quickly led to further research and development and field testing. MQM Solutions is producing both military (JGPD-HME M333) and commercial (Decon PLUS™) versions of the decontaminant.

During testing, the Army-led team neutralized a variety of targets representing potential threats faced daily by the Department of Defense: sulfur mustard; nerve agents; anthrax; ricin; numerous toxic industrial materials; pathogenic microorganisms or microbial products including bird flu virus and HIV; bacterial endospores; fungi; mycobacteria; vegetative bacteria; protozoa; and prions. After the transfer to MQM, Decon PLUS also was tested independently at CBC and the Buffalo, New York-based testing company Avarint, demonstrating the ability to neutralize the opioids fentanyl and carfentanil.

Each Decon PLUS Kit comprises three laminated-foil pouches of decontaminant powder, stable for at least five years if unopened. The powder is easily reconstituted with any water source, including saltwater or brackish water, to produce the decontaminant use dilution. Decon PLUS is available in a range of sizes to produce as little as 18 fluid ounces of use dilution (for personal protective equipment or other small pieces of equipment) or up to 25 gallons (for vehicles or large-scale decontamination lines).

Above: *Decon being mixed for use at a fire and police training session. Inside the test tube, US Army CCDC Chemical Biological Center researchers mix agent with metal organic frameworks (MOFs) and oxygen. Exposure to light starts the MOF's oxidation process, which neutralizes the agent.*

The unique decontaminant chemical formulation is lighter and takes up less space than most conventional liquid decontamination products like hypochlorite solutions (bleach) or hydrogen peroxide-based products. The new technology also addresses other logistical problems related to available decontaminant liquids, many of which are unstable without controlled transportation and storage systems. In addition, many liquid decontaminants are corrosive to multiple materials, are incompatible with materials like plastics or paints, are complicated to use, or require special packaging.

The transferred technology expands federal security strategies against potential biological and chemical weapons beyond the defense arena to environments like public transport or manufacturing. Civilian users include those in law enforcement, fire and rescue, and emergency preparedness. Along with the public safety benefits, the technology's potential for opioid decontamination embodies the CCDC's larger effort to combat opioid misuse.

Above: *Dr. George Wagner, inventor of the dry decontaminant technology, passed away in December 2019. He will be missed.*

Left to right: *Marti Elder, Iain McVey, Timothy Meilander, Lawrence Procell, Blake Sajonia*

Left to right: *Kevin Morrissey, Amanda Schenning, Matthew Jones*

EMERGENCY SYSTEM CUTS COMMUNICATIONS CHAOS

Department of Defense

US Air Force Research Laboratory 711th Human Performance Wing

Technology developed by the Air Force Research Laboratory (AFRL) cuts through the communications clutter and chaos associated with large-scale emergencies — from natural disasters to terrorist attacks — and maximizes first responders' ability to ensure public safety.

The secure, cloud-based system features AFRL technology that transcribes and triages information from multiple communications channels. It also has technology from Dayton, Ohio-based GlobalFlyte that includes a smartphone app to provide first responder location and status, an incident mapping feature with layers of site data, and a tethered drone that uploads real-time information. The AFRL technology was licensed by GlobalFlyte in 2016, and the integrated system is now commercially available as Aware by GlobalFlyte.

The system provides secure real-time transcription texts and visualization, records of incident data, and the capability to highlight keywords such as "mayday" or "shots fired." It saves transmissions as audio files that users can listen to later, at regular or accelerated speeds. Users can read transcribed messages in real time, on any device with a screen, while also listening to radio channels.

The most significant outcome is the ability of Aware users to clearly monitor and assess messages from multiple groups (channels) that are all being sent simultaneously. Separating radio transmissions and providing transcriptions can increase comprehension of received information significantly, which leads to more accurate decisions as well as more efficient and effective responses that save lives and protect property.

Above: An example of multi-modal communication

Left to right: Dr. James Kearns, Dr. Brian Simpson

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The product is in use at many police and fire departments, several National Guard bases, the University of Cincinnati, and Wright-Patterson Air Force Base Security Forces, and is being considered for prisons and airports.

Aware's technology transfer (T2) story began in 2014 when the Wright Brothers Institute introduced GlobalFlyte leadership to the scientists at AFRL's 711th Human Performance Wing (711 HPW) who were involved in developing what was then called the Multi-Modal Communications (MMC) system.

On Nov. 20, 2015, the two partners signed a Cooperative Research and Development Agreement (CRADA), followed quickly by a patent license agreement (PLA) signed Jan. 11, 2016 — less than a week after 711 HPW's MMC patent was issued. The exclusive license covered emergency response for state and local governments and for international ministries of defense.

In 2019, the laboratory's T2 collaboration with GlobalFlyte was broadened via a two-year, $1.5 million Phase 2 grant to create, deploy and test a military version called WarFlyte. GlobalFlyte also recently partnered with the new Dayton-based company VyrticalXpress LLC, which signed an exclusive PLA with 711 HPW in April 2019, to license the MMC technology for medical use. Among the planned outcomes is improved cargo delivery for life-changing or time-critical missions, including transport of organs via drones along medical corridors.

PRESSURE CONTROL ENHANCES HYDROGEN REFUELING

Department of Energy
Argonne National Laboratory

The commercialization of a refueling technology for gaseous fuels, developed and patented by Argonne National Laboratory, could boost public interest in pollutant-reducing vehicles powered by hydrogen fuel cells and compressed natural gas (CNG) by significantly reducing the costs associated with fueling them.

This commercialization was made possible when pressure-consolidation refueling technology developed by Argonne scientists was transferred to PDC Machines Inc., a global compressor manufacturer based in Warminster, Pennsylvania, between August 2017 and May 2019.

Hydrogen fuel cell vehicles are powered by clean, domestic energy sources and provide more than double the efficiency of conventional gasoline internal combustion engine vehicles, while emitting no pollutants (only water vapor) from the tailpipe. However, the capital costs for hydrogen fueling stations are high. Argonne's refueling technology significantly lowers these costs.

Vehicles using clean gaseous fuels, such as hydrogen, are more challenging to fuel than those using liquid hydrocarbon fuels like gasoline and diesel. To pack enough fuel gas molecules inside a vehicle's tank, the fuel must be compressed to very high pressures at the refueling station. Several stages of compression may be needed to fuel such vehicles, making the compressor a major contributor to refueling costs.

The effectiveness of a refueling compressor depends on the pressure of the supply it draws from. As hydrogen is drawn from the ground storage to supply the compressor, its pressure drops over time, which reduces the compressor's fueling capacity. Argonne's technology consolidates the refueling station storage pressure to maintain a high-pressure hydrogen supply for periods of peak demand, which translates to higher throughput and lower compressor costs.

The pressure consolidation technology could save refueling stations up to 30% of their equipment costs or allow an existing station to triple its fueling capacity without buying a new compressor. It also makes transferring fuel from

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delivered storage containers at least 20% more efficient, which in turn reduces fuel transportation and delivery costs.

The transferred technology includes the pressure consolidation refueling algorithm and a software tool that sizes refueling station equipment, simulates vehicle refueling, and optimizes station cost for a given vehicle demand profile. During the technology transfer, PDC integrated Argonne's technology into its product development and control process.

The technology was transferred through two mechanisms: (1) the Hydrogen at Scale (H2@Scale) initiative at the Department of Energy (DOE) and (2) a technology licensing agreement between Argonne and PDC. H2@Scale required a standardized pre-negotiated version of a Cooperative Research and Development Agreement (CRADA) with Argonne to streamline the technology transfer process.

The potential societal impacts of the transferred technology are numerous. It could help small businesses in the US compete in the rapidly growing fuel cell vehicle industry, which would create jobs, increase exports and accelerate the transition from fossil fuel energy toward zero carbon emission technologies.

Left to right: *Kareem Afzal, Munidhar Biruduganti, Christopher Claxton, Dr. Amgad Elgowainy, Gregory Halder, William Ingle, Dr. Krishna Reddi*

LLNL FOAM PLUG REINVENTS VASCULAR INTERVENTION

Department of Energy
Lawrence Livermore National Laboratory

A shape memory foam material developed at a weapons laboratory is the foundation of a lifesaving medical device that is now available to the public thanks to technology transfer.

Blood flow through diseased or damaged vessels puts patients at an increased risk of stroke, severe pain, uncontrolled bleeding, and even death. The IMPEDE® Embolization Plug, incorporating a foam technology developed at Lawrence Livermore National Laboratory (LLNL), provides a physical barrier to obstruct or reduce the rate of blood flow, reducing the risk of complications.

The foam plug, made of a polyurethane shaped memory polymer (SMP) initially intended for weapons applications, is crimped to fit into any diagnostic catheter for easy delivery into a diseased blood vessel. Within minutes of delivery, the SMP foam expands to divert blood flow away from the diseased vessel and toward healthy vessels.

The foam plug is less likely than metal plugs or coils to tear through blood vessel walls and is easier to navigate through the vascular system, because of the material's compliant nature. Unlike metal devices, the foam plug degrades over time and is replaced with the patient's natural connective tissue and collagen, all without long-term inflammation or toxicity.

The foam plug is porous, giving it more surface area than non-porous embolization devices. Preclinical studies indicate that this difference leads to improved long-term healing using the foam plug, and a lower likelihood that re-treatment — which has associated risks — will be needed.

Clinically, more than 200 patients have been treated successfully with the device for conditions such as pulmonary arteriovenous malformations, tumor resection, and pelvic congestion syndrome. No patients reported adverse effects.

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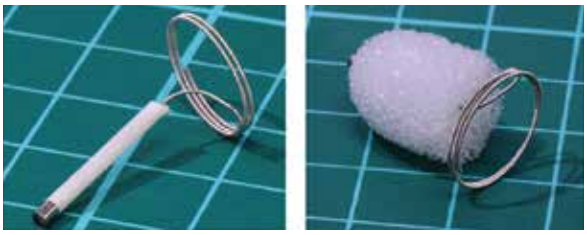
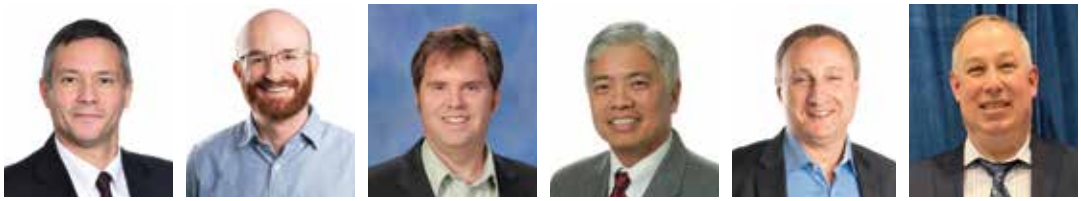
Complementary to the IMPEDE® Embolization Plug, the IMPEDE-FX device is also available for use when embolization of blood vessel regions with larger lengths and diameters is needed. The IMPEDE® Embolization Plug received 501(k) clearance from the US Food and Drug Administration (FDA) in 2018, and the IMPEDE®-FX received FDA 501(k) clearance in 2019.

Established medical device companies previously reviewed LLNL's SMP technology but were unwilling to deviate from the industry standard of metal-based occlusion devices. Driven by a belief in the technology, the principal investigator (PI) of the project, Duncan Maitland, left LLNL in 2007 to join the faculty of Texas A&M University and create a start-up, now known as Shape Memory Medical Inc., to develop vascular occlusion devices using the novel foam technology.

This type of PI transfer can typically create problems related to intellectual property (IP) for both the past and present institutions. To avoid such issues, an inter-institutional agreement developed by LLNL's Innovation and Partnerships Office gave Texas A&M access to a significant portfolio of background IP for the polymer material and provided LLNL with access to future IP. Technology transfer agreements related to commercialization of the product were also executed between LLNL and Shape Memory Medical, which is now based in Santa Clara, California.



Above: Crimped IMPEDE Embolization Plug (left) and expanded IMPEDE device (right).



Left to right: Nicholas Chremos, Todd Landsman, Duncan Maitland, Genaro Mempin, Edward Ruppel, Thomas Wilson

RECYCLING EXPANDS ACCESS TO RARE EARTH METALS

Department of Energy
Oak Ridge National Laboratory

Recycling technologies developed by Oak Ridge National Laboratory (ORNL) are poised to expand the US availability of rare earth metals used in magnets and lasers, which in turn will provide an economic boost to the energy, transportation and communications industries.

Rare earth materials — particularly the elements neodymium (Nd), praseodymium (Pr) and dysprosium (Dy) — are needed for a wide range of applications. From hard-disk drives alone, it is estimated that more than 10,000 tons of scrap permanent magnets containing Nd, Pr and Dy are available for recycling. But less than 1% of rare earth magnets are being recycled because of the high cost, low efficiency and environmental hazards of conventional processing technologies.

ORNL's success in partnering with Dallas-based Momentum Technologies to commercialize its recycling processes has significant implications for the US, which has limited sources — mostly non-domestic — for rare earth elements. Commercialization of ORNL's extraction and separation technologies will help expand US access to these materials, opening a new door to domestic manufacturing of permanent magnets. It will also help to improve the nation's supply of rare earth elements that are essential for clean energy technologies such as wind turbines, electric vehicles, efficient lighting and advanced batteries.

Working within the Critical Materials Institute (CMI) at the Department of Energy (DOE), ORNL researchers developed a novel simplified process that eliminates many of the barriers to electronics recycling. The single-step process for recovering rare earth elements from scrap magnets is more environmentally friendly than current methods and has the potential to be a more cost-effective approach while achieving the purification levels necessary for industry adoption.

Above: *Licensee Preston Bryant (left), founder and chief executive officer of Momentum Technologies, and Thomas Zacharia, director of Oak Ridge National Laboratory. (Credit: Oak Ridge National Laboratory)*

ORNL's Technology Transfer Office (TTO) licensed this technology to Momentum in 2016 and continued its support during the commercialization process. After the successful development of two prototypes, Momentum and ORNL collaborated to win a grant from the DOE's Technology Commercialization Fund (TCF). Under the TCF project, Momentum and ORNL worked to achieve pilot-scale production capabilities by fall 2019.

Momentum also licensed a second, complementary technology from ORNL in 2019 — a process to separate the lighter rare earth elements (such as Nd and Pr) from the heavier ones (such as Dy), which are more valuable. A mixture of the three rare earth oxides sells for $50 a kilogram; separating Dy from Nd and Pr enables its oxide to be sold for five times as much.

This second license has co-exclusive terms, limiting the competitive landscape to allow Momentum to attract investors while enabling ORNL to license to up to two additional companies, maximizing technology deployment.

At the time of the submission of this award application, Momentum Technologies and ORNL were demonstrating to key industry players that the start-up now has the capability to recover and separate rare earth materials from scrap magnets on a commercial scale.

Below: *A team of ORNL researchers helped licensee Momentum Technologies scale up the technology for commercial deployment. Pictured left to right are Dale Adcock, Ramesh Bhave, Priyesh Wagh, Pranathi Gangavarapu, Syed Islam, and Larry Powell. (Credit: Carlos Jones, Oak Ridge National Laboratory)*

Above, left to right: *Dr. Ramesh Bhave, Preston Bryant, Dr. Nestor Franco*

ORNL'S ULTRASONIC TECHNOLOGY REDEFINES DRYING

Department of Energy
Oak Ridge National Laboratory

Ultrasonic technology from Oak Ridge National Laboratory (ORNL) is taking the heat out of the drying process, which could drastically reduce industrial and household energy costs.

Drying is responsible for 15% of all energy consumption in the US, whether it is residential (such as laundry) or industrial (such as paper production). Americans spend $9 billion in utility bills annually on drying their clothes. In the industrial sector, energy costs for drying are even higher.

Inspired by the way dogs dry themselves by shaking their bodies, an ORNL team led by researcher Ayyoub Momen developed an ultrasonic drying technology that, depending on the application, can be five times more efficient and two times faster than conventional heat-based drying systems.

The technology uses piezoelectric transducers — materials that contract and expand when a voltage signal is applied. When attached to a custom smart amplifier, the transducers vibrate at an extremely high frequency. These vibrations turn the water into a cool mist made of very fine droplets. This is highly preferable to heat-based dryers, which use large amounts of energy to convert liquid water to steam and take twice as long as the ultrasonic approach.

Momen and two partners launched a start-up in Knoxville, Tennessee, called Ultrasonic Technology Solutions (UTS) to commercialize ORNL's technology, with an exclusive license in industrial and commercial fields of use. Because Momen is continuing to work at ORNL, the lab's Technology Transfer Office worked closely with the Department of Energy (DOE) to develop a conflict of interest mitigation plan appropriate for this entrepreneurial activity.

The original goal of ORNL's technology, developed in collaboration with GE Appliances under a project funded by the DOE, was to create an ultrasonic residential clothes dryer that could save up to $900 million in consumer utility costs over 10 years and support the creation of 6,350 jobs. UTS is pursuing a separate commercialization approach focused on industrial applications.

The decision to pursue the customized drying applications of the industrial sector — markets that can absorb the upfront costs of attaining greater energy efficiency — is expected to accelerate the development of new technologies to increase the energy efficiency of drying.

This technology transfer success could also affect space exploration, thanks to a feasibility study funded by the National Aeronautics and Space Administration (NASA). The high costs associated with returning astronauts' solid waste to Earth could be dramatically reduced with the ORNL technology. Furthermore, filtering and reusing the water ultrasonically removed from solid waste would reduce the amount of water needed to be launched into space. This would in turn save payload weight and mass, freeing up storage space and/or reducing spacecraft propellant costs.

Above: *Dr. Ayyoub Momen, inventor and entrepreneur, demonstrates the press-type flatbed ultrasonic dryer developed at ORNL. The unit's piezoelectric transducers vibrate at high frequency, converting the water into tiny droplets that leave the fabric as a cool mist that resembles steam but without the energy required to change the water from liquid to vapor. (Credit: Oak Ridge National Laboratory)*

Left to right: *Dr. Nestor Franco, Dr. Ayyoub Momen, Dr. David Sims*

DOE LABS PACK SUITCASE WITH ENERGY SOLUTIONS

Department of Energy
Pacific Northwest National Laboratory, Lawrence Berkeley National Laboratory

Owners of small commercial buildings can now find energy savings in a suitcase, thanks to technology transfer. Researchers from two federal laboratories packed a suitcase-based kit with technology to help the owners of small commercial buildings improve energy efficiency.

This technology can lead to whole-building energy savings estimated at 10%. In addition to lower energy bills, savings are also associated with faster and easier retro-commissioning, since anyone can identify energy-saving opportunities that would typically require the hands-on labor and expertise of a team of building engineers.

The Retro-commissioning Sensor Suitcase — an "expert in a suitcase" — is a portable case containing 16 matchbox-sized, battery-powered sensors designed for use in commercial buildings of 50,000 square feet or smaller. Retro-commissioning refers to the process of analyzing and improving the functionality of systems within an existing building.

Researchers from Pacific Northwest National Laboratory (PNNL) developed the suitcase hardware, sensors and tablet software. A team from Lawrence Berkeley National Laboratory (LBNL) developed the algorithms to analyze the data, the analysis software and its user interface.

Following easy-to-use, tablet-based graphical instructions, the user mounts the sensors in specific locations throughout the building — for example, on lighting fixtures, near thermostats and on rooftop heating and air-conditioning systems.

The sensors are designed to measure conditions that affect energy use, such as indoor and outdoor temperature and whether lights are on. Four to six weeks after initial deployment, the user collects the sensors and puts them into their slots in the suitcase. Data from the sensors are transferred to a personal computer for analysis. A report is quickly generated on the computer screen with building-specific energy savings recommendations.

Above: *Retro-commissioning Sensor Suitcase sensors and tablet, developed and licensed by PNNL and LBNL.*

The Retro-commissioning Sensor Suitcase was licensed to GreenPath Energy Solutions of Orlando, Florida, in April 2017 via a non-exclusive agreement, and the patent was granted in December 2018. The PNNL commercialization manager connected GreenPath with Zepher, a prototyping company based in Bingen, Washington, which GreenPath contracted to manufacture a commercial prototype.

PNNL then executed an inter-institutional agreement with LBNL that allowed PNNL to take the lead on intellectual property and marketing of the technology. This streamlined licensing activity so that the licensees could negotiate with just one entity to secure access to patents and copyrights required to commercialize the platform.

Additionally, since the license was non-exclusive, PNNL kept four prototypes in working order to send to additional potential licensees and end users for evaluation. As GreenPath's prototype continues to mature into a commercially viable product, pilot testing is underway with BC Hydro in Vancouver, British Columbia, and the Integrated Design Lab/Idaho Power in Boise. GreenPath plans additional testing with the US Army and Willdan Energy Solutions/Con Edison in Brooklyn, New York.

Top row, left to right: *Michael Brambley, Samuel Fernandes, Samuel Graham, Eric Gonzalez, Jessica Granderson, Michael Hughes, Sara Hunt, Catherine Koh*
Bottom row, left to right: *Jennifer Lee, Shanshan Li, Guanjin Lin, Robin Mitchell, Sharon Pierre, James Skorpik, Adam Stolz, Danny Taasevigen*

SENSORS TRACK IMPACT OF POWER PLANTS ON WILDLIFE

Department of Energy
Pacific Northwest National Laboratory

Tracking technology developed by the Pacific Northwest National Laboratory (PNNL) is now commercially available to help the operators of dams and wind turbines assess the effects of those structures on nearby fish and wildlife.

Increasing demand for renewable energy sources like hydropower and wind power has increased concern about the potential impacts on fish and wildlife. In response, PNNL created a suite of tracking and sensing technologies for studying the environmental impacts of dams, wind turbines and other power-generating structures.

The suite includes customizable tags, underwater sensing devices and software. The devices and tags are small, lightweight and long-lasting — improvements on previous technology. They can be employed in a range of ecosystems — rivers, oceans, land and air — and can be modified for a wide variety of species including birds, bats, fish and amphibians.

Advanced Telemetry Systems (ATS) of Isanti, Minnesota, is the sole licensee of these technologies. ATS, which has a long history of providing environmental researchers and managers with tracking and monitoring technologies for commercial use, acquired four licenses for the PNNL products.

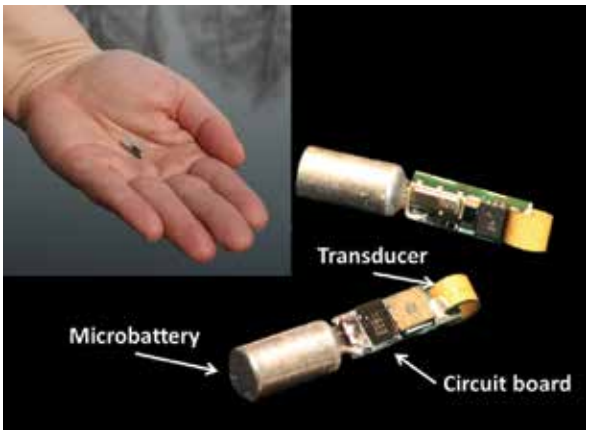
ATS has sold 20,000 units of PNNL's Injectable Acoustic Tag, which lasts four times longer and weighs 30% less than other transmitters. Inserted with a simple needle injection that allows fish to heal quickly, the acoustic tag can be configured for a delayed start, temperature sensor and codes that create unique identifiers for each individual and the type of data being collected.

This injectable tag facilitates migration research on fish that have never been studied because of their small size or age, including juvenile salmon. These studies can give researchers and dam operators information on how to keep fish populations thriving.

Sensor Fish is an autonomous body double used to collect data on the physical stressors that fish experience during downstream passage at hydraulic structures. In less than a year after executing the Sensor Fish license, ATS sold 100 of the devices in Australia, Canada, Europe and the United States.

The RF Tag had been commercially available for only a few weeks when the application for this award was submitted, but was already drawing interest. This tag is intended for use when acoustic systems are not practical or recommended, and is especially useful for tagging terrestrial animals. Its small size makes it suitable for tracking birds, bats, small mammals and amphibians. One potential application involves tracking and studying bat behavior around wind turbines. Because bats pollinate 700 plant species, some of which are used for food and medicine, use of the tags could benefit the agriculture industry as well as the bat population.

Below: PNNL's Sensor Fish technology offers researchers and dam operators precise measurements related to physical stressors fish experience as they pass downstream through hydraulic structures.



Above: PNNL developed a small acoustic transmitter that can be injected instead of surgically implanted. The transmitter allows for the study of fish species and sizes that are too small for previous transmitters.

Above: PNNL Laboratory Fellow Daniel Deng demonstrated how to use the Sensor Fish device last fall at a Sensor Fish study at Ice Harbor Dam.

T2 DEAL AIMS TO SOLVE MEDICAL ISOTOPE SHORTAGE

Department of Energy
Sandia National Laboratories

A technology transfer partnership between Sandia National Laboratories and Eden Radioisotopes LLC of Albuquerque, New Mexico, is poised to address the global shortage of a radioactive material that cancer and heart patients depend on for diagnostic imaging.

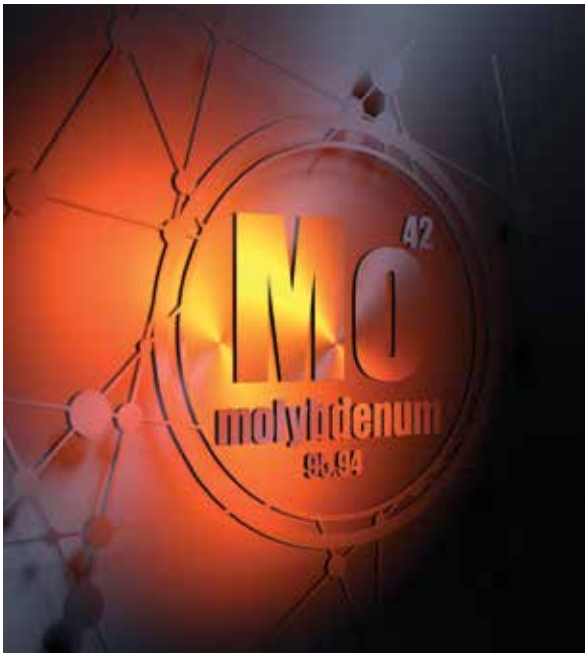
A medical isotope known as molybdenum-99 (Mo-99) decays to make technetium-99m (Tc-99m), which is then used in nuclear medicine imaging procedures. Mo-99 decays quickly, which makes it well suited for the medical industry but also means it cannot be stockpiled. One reactor's unplanned outage quickly translates into a supply shortage for patients needing Tc-99m imaging.

To address this need, Sandia researchers have developed a nuclear reactor concept that is low power and small in size, and uses low enriched uranium. This small design results in highly efficient and cost-effective production of Mo-99. Once built, it could produce enough Mo-99 to meet current world demand. Other, aging reactors are larger, require higher power, and were originally designed for research purposes.

Eden, a company formed by former Sandia intern Bennett Lee expressly to commercialize this concept, obtained a license for the patent-pending reactor technology in 2013. Sandia knew a large investment would be needed, so the license was structured to be flexible, with fewer upfront fees and more emphasis on royalties than is typical. The deal also included incentives for Eden to build its medical isotopes production facility in New Mexico, where Sandia is located.

The patent was issued in 2017, and Eden secured funding in May 2019 from Abo Empire LLC, a Yates family company based in Artesia, New Mexico. The funding will be used to finalize a license application for the Nuclear Regulatory Commission and to build the reactor and production facility.

Meanwhile, the shortage of medical isotopes persists. Other companies with alternative types of technology have been delayed by cost or technology issues, while existing reactors in Canada and the Netherlands either have ended or are nearing the end of their useful life. Eden plans to be in commercial operation in four years.



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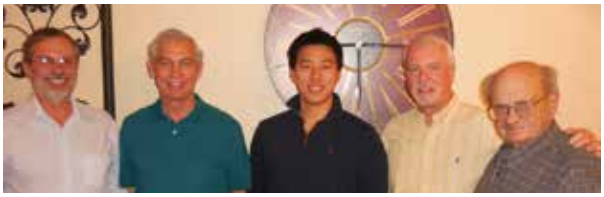
Eden has purchased land for its facility outside Eunice, New Mexico, where the workforce is familiar with nuclear-related industries because of its proximity to Urenco USA's uranium enrichment facility in Eunice and the Department of Energy's Waste Isolation Pilot Plant in nearby Carlsbad.

Once the Eden facility is up and running, it will result in projected taxable sales of $945 million over 10 years, along with personnel salaries; city, county and state tax contributions; and economic development impact of more than $150 million over the next 10 years.



Left to right: *Kevin Bieg, Matt Burger, Dr. Bob Westervelt*



Above: *Eden co-founders Dr. Edward Parma, Milton Vernon, Bennett Lee, Chris Wagner and Dr. Richard Coats*

SANDIA SCIENCE FUELS FIRST ZERO-EMISSION FERRY

Sandia National Laboratories

Department of Energy
Sandia National Laboratories

This year, the world's first zero-emission passenger ferry is expected to begin operating in the San Francisco Bay, propelled by hydrogen fuel cell technology investigated for marine applications by Sandia National Laboratories and a fleet of collaborative commercialization agreements.

The Water-Go-Round is a 70-foot ferry that will carry up to 84 passengers at speeds of up to 22 knots, powered by two 300 kW (400 horsepower) shaft motors. This ferry will demonstrate the maritime potential of hydrogen fuel cells to the commercial and regulatory communities.

For 15 years, Sandia's Hydrogen and Fuel Cells research program has evaluated the feasibility of using hydrogen fuel cells in a variety of applications, including pier-side port power. Following an inquiry from a San Francisco ferry boat operator in 2014, Sandia scientists examined the use of hydrogen on maritime vessels.

With the commercial maritime sector contributing as much to global carbon dioxide (CO_2) emissions as aviation, new international shipping regulations are designed to reduce emissions. The maritime industry is looking at alternative fuels as a way to maintain operational flexibility, commercial viability, and regulatory compliance.

Using domestically produced hydrogen in fuel cells is a zero-emission pathway to meeting cost and regulatory challenges. Fuel cells also have other advantages over conventional diesel engines, including higher energy efficiency, quiet operation and no risk of contaminating fuel spills.

The US Department of Transportation's Maritime Administration funded Sandia's work, performed in collaboration with commercial US naval architects (Glosten and Elliott Bay Design Group, both of Seattle) and maritime regulatory bodies (US Coast Guard, American Bureau of Shipping and international classification society DNV GL). Each project was built upon the last to show that hydrogen fuel cells could power boats of various types and sizes, safely and economically, all with zero vessel emissions. The success of these projects also leveraged past efforts co-sponsored by the US Department of Energy's Fuel Cell Technologies Office, aimed at demonstrating fuel cells for shore-side power needs.

In 2017, as part of the lab's Entrepreneurial Separation to Transfer Technology program, one of the scientists, Joe Pratt, left Sandia to launch start-up company Golden Gate Zero Emission Marine (GGZEM). GGZEM began construction of the Water-Go-Round at the shipyards of Bay Ship & Yacht in Alameda, California.

The Water-Go-Round is being funded by SW/TCH Maritime, an impact investment platform building the first fleet of maritime vessels dedicated exclusively to decarbonization, and a $3 million grant from the California Air Resources Board through the Bay Area Air Quality Management district. This project is also supported by the California Climate Investments program. As part of the project, Sandia has a Cooperative Research and Development Agreement (CRADA) with GGZEM to independently measure the performance of the fuel cells on the Water-Go-Round.

Above left to right: *Joe Pratt, CEO and CTO, Golden Gate Zero Emission Marine, and Lennie Klebanoff, principal member of the technical staff, Sandia National Laboratories.*

Above: *Engineering model of the completed Water-Go-Round ferry, which will be the first fuel-cell vessel in the Western Hemisphere and the first commercial fuel-cell ferry in the world. The Water-Go-Round is a 70-foot aluminum catamaran that will have a top speed of 22 knots.*

ASSAY FOR GLOBAL SURVEILLANCE OF DRUG-RESISTANT HIV-1

Department of Health and Human Services
US Centers for Disease Control and Prevention

HIV is a leading cause of death worldwide. According to World Health Organization (WHO) data, in 2018, 37.9 million people including 1.7 million children lived with HIV globally, and the disease claimed 770,000 lives. Another 1.7 million people became newly infected with HIV in 2018. Only 23.3 million people were receiving HIV treatment as of December 2018.

HIV has the ability to mutate and replicate itself in the presence of antiretroviral drugs, which is called HIV drug resistance (HIVDR). Consequences of HIVDR include ineffective treatment for those beginning therapy, treatment failure for those on treatment, and spread of drug-resistant HIV to newly infected persons.

Researchers at the Centers for Disease Control and Prevention (CDC) developed a low-cost technology to rapidly detect HIV-1 drug resistance in plasma and dried blood spot (DBS) samples with 95.8% genotyping sensitivity. CDC's partners at Thermo Fisher Scientific Inc., based in Waltham, Massachusetts, have licensed, further developed and incorporated the technology into a commercialized product.

Thermo Fisher's Applied Biosystems HIV-1 Genotyping Kit provides a cost-effective assay, scalable workflow, easy-to-read sequencing results and robust test performance. The technology delivers high efficiency in genotyping diverse HIV-1 group M strains circulating globally from plasma samples and dried blood spots with substantial reagent cost savings. The DBS testing capability removes a huge barrier for many resource-poor areas where WHO recommends HIV drug resistance surveillance and monitoring, but where storage and timely transportation of plasma samples from remote locations remain challenging.

The American Type Culture Collection (ATCC), based in Manassas, Virginia, first licensed CDC's technology in 2013 and partnered with Thermo Fisher. Thermo Fisher later signed a non-exclusive patent license agreement in January 2017 for commercializing the technology.

CDC's Technology Transfer Office handled the first patent applications, agreements and licensing. The CDC Team at the National Institute of Allergy and Infectious Diseases (NIAID) Technology Transfer and Intellectual Property Office oversaw licensing and patenting on CDC's behalf beginning in October 2013. CDC researchers collaborated with partners and authored or co-authored 38 publications.

Above: *The photo shows the HIV-1 Genotyping Kit: Amplification Module, part of Thermo Fisher Scientific's Applied BiosystemsTM product line. The commercial product reflects a successful transfer of CDC technology. Source: Thermo Fisher Scientific.*

The elimination of HIV is one of CDC's "Winnable Battles," which are public health priorities in which CDC and its partners can make significant progress in a relatively short time. This technology transfer supports the Winnable Battle in monitoring HIV drug resistance for optimal HIV infection therapy.

As antiretroviral therapy (ART) scale-up continues, population-based HIVDR surveillance is vital to ensuring sustained effectiveness of ART treatment regimens and preventing transmission of drug-resistant HIV to newly infected persons. Importantly, in 2017, WHO issued guidelines recommending using an alternative first-line treatment in 12 countries for which resistance to current drugs exceeded 10% of the HIV population.

Since 2017, the Thermo Fisher kit has been sold to 47 customers, including distributors in 27 countries. The kits are now in use at genotyping labs in Africa, the Americas, and Asia.

Left to right: *Francisco Candal, Joshua DeVos, Dr. Tara Kirby, Suzanne Seavello Shope, Karen Surabian, Nick Wagar, Chunfu Yang, Dr. Zhiyong Zhou*

NCI'S PERSONALIZED CANCER THERAPY OFFERS HOPE

Department of Health and Human Services - National Institutes of Health
National Cancer Institute

A personalized treatment approach developed by the National Cancer Institute (NCI) is providing hope for patients with an advanced cancer who have exhausted all other treatments.

A collaboration between NCI and Iovance Biotherapeutics of San Carlos, California, resulted in an ongoing clinical trial in which 44% of patients with advanced cervical cancer had a positive response to the new treatment — up to 11 times higher than response rates associated with conventional therapies. In addition, recent data from two trials at NCI in patients with metastatic melanoma, an aggressive skin cancer, confirmed that the new treatment was associated with high durable objective responses. In a 93-patient Phase 2 trial, the objective response rate (ORR) was 56%.

These promising clinical trial results are rooted in discoveries made by Dr. Steven Rosenberg, chief of the NCI Surgery Branch. Early in his career, Rosenberg observed the spontaneous regression of a terminal cancer patient's tumor. He believed the remission had to do with the patient's immune system. In the early stages of cancer, the immune system tries to fight by mobilizing special immune cells known as T lymphocytes. Rosenberg later identified tumor infiltrating lymphocytes (TILs; immune cells found in cancer tumors) that have cancer-fighting properties.

In 2011, NCI and Iovance (formerly Lion Biotechnologies) entered into a Cooperative Research and Development Agreement (CRADA) for the development and commercialization of adoptive cell therapy (ACT) using TILs to treat different types of solid cancers. ACT treats a patient using his or her own immune cells — extracting them, multiplying them and then reintroducing them into the patient.

The initial tech transfer launched the company's effort to develop and clinically advance TIL therapy for patients with recurrent, metastatic or persistent cervical cancer and metastatic melanoma. Since then, NCI, Iovance and collaborators expanded TIL treatment to earlier lines of therapy for melanoma, head and neck, and non-small cell lung cancer patients.

Technology licenses between NCI and Iovance were established to grant Iovance rights to NIH's TIL-related patents. Iovance then applied its own proprietary processes to streamline TIL manufacturing and conduct multisite clinical trials essential to obtaining Food and Drug Administration (FDA) approval.

Illustration of cervical cancer.

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In May 2019, the FDA gave the technology a Breakthrough Therapy designation for advanced cervical cancer. This designation is intended to expedite development and review of drugs for serious or life-threatening conditions. The criteria require preliminary clinical evidence demonstrating that the drug may be a substantial improvement over available therapies.

In June 2019, Iovance began construction of a state-of-the-art commercial-scale TIL production facility in Philadelphia. The facility is expected to create hundreds of jobs and meet demand for a therapy with potential to help thousands of patients with deadly, previously untreatable forms of cancer.

Left to right: *Dr. Andrew Burke, Dr. Aida Cremesti, Dr. Maria Fardis, Dr. Christian Hinrichs, Dr. Steven Rosenberg*

AWARDS

INDIVIDUAL AND TEAM AWARDS

GENOMIC NETWORK HELPS FIGHT FOODBORNE ILLNESSES

US Food and Drug Administration, US Centers for Disease Control and Prevention, National Institutes of Health, National Library of Medicine, US Department of Agriculture Food Safety and Inspection Service

During a foodborne disease outbreak, identifying the source of food contamination is key to ensuring public safety. A new public genomic surveillance platform, and the genomic database that underlies it, is helping U.S. public health officials quickly identify the sources of food-borne illness and contamination.

The Pathogen Detection platform was created at NIH-National Center for Biotechnology Information (NCBI), and the underlying genomic database includes contributions from the US Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDC), U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS) and other global partners.

NCBI Pathogen Detection provides an easy-to-use web interface for users to track the daily influx of new isolates (biological strains) and query the deep underlying database for foodborne illness-causing microorganisms (pathogens) under surveillance. The NCBI web portal groups closely related genetic sequences into trackable "clusters," providing clues and leading to potential food contamination sources.

The platform also provides an antibiotic resistance profile for each isolate, enabling surveillance of antibiotic resistance in emerging and reemerging pathogens. These results provide US public health officials at the FDA, CDC, USDA-FSIS, international partners, and dozens of smaller public health laboratories the same public view of the US food-borne surveillance data, allowing seamless communication across many different levels of public health entities.

Four federal agencies work side by side to monitor and prevent foodborne illness. The FDA contributes food and environmental pathogen isolates from its GenomeTrakr network of field, state and partner labs. The CDC uses its mature PulseNet network of state and local laboratories to upload all clinical data. The USDA-FSIS contributes isolates from the foods and facilities it regulates, such as meat, poultry and egg products. The genomic sequences collected are all publicly available within the NCBI Pathogen Detection database and analysis portal built specifically for this project.

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These genomic data have been used in more than 500 FDA investigations and several investigations by the CDC and USDA-FSIS. It has provided expeditious leads to outbreak sources, and many have led to accurate compliance actions related to contaminated food product recalls. The Pathogen Detection portal has helped the FDA and partners more productively monitor the effectiveness of preventive controls in food manufacturing environments.

The transition to genomic data in a publicly accessible database enables much finer resolution for source tracking and expands the participation and reach of contributing laboratories, enabling a truly global foodborne pathogen surveillance platform.

As the database expands, this high-resolution tool will continue to provide new insights into outbreak causes and risks, ensure effective and timely control of newly emerging and reemerging pathogens, and improve overall food safety.

Above: Dr. Marc Allard (left) and Dr. Eric Brown record a podcast in which they discuss the GenomeTrakr network. Access the podcast at https://www.fda.gov/media/104782/download.

INTERAGENCY PARTNERSHIP TEAM MEMBERS

FDA: Dr. Ruth Timme, Dr. Steve Musser, Dr. Whitney Hastings, Dr. Marc Allard, Dr. Eric Brown, Dr. Errol Strain, Dr. Eric Stevens, Maria Balkey, Justin Payne, Dr. Sandra Tallent; CDC: Dr. Elija Trees, Dr. Rebecca Lindsey, Dr. Lee Katz, Dr. Heather Carleton; NIH: Dr. William Klimke, Dr. Richa Agarwala, Alex Kotliarov; USDA: Dr. Uday Dessai, Dr. Mustafa Simmons, Dr. Glenn Tillman

DEFTECH T2 CENTER TARGETS MARYLAND BUSINESSES

Department of Defense

US Army Combat Capabilities Development Command Chemical Biological Center

An Army-led pilot network of federal laboratories, government entities and private-sector partners has diversified income streams in Maryland and established a model for promoting and supporting technology transfer at state and local levels.

The Maryland Department of Commerce Office of Military and Federal Affairs and the US Army Combat Capabilities Development Command (CCDC) jointly created the Maryland Defense Technology Commercialization Center (DefTech Center) to support transferring technology out of federal labs and helping local companies commercialize viable products. The Harford County Office of Community & Economic Development provides in-kind facility and utilities support for the DefTech Headquarters housed within the Harford Business Innovation Center and co-located with other aligned small-business resources.

Within the network, CCDC's role is to develop technologies for potential commercialization and engage prospective DefTech clients. Within CCDC, the Army Research Laboratory (ARL); the Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR, formerly CERDEC) Center; and the Chemical Biological Center (CBC, formerly ECBC) all play key roles in the DefTech partnership.

Funding from the Department of Defense (DoD) Office of Economic Adjustment helped launch a 12-month pilot program. A competitive bidding process led to the selection of Axcel Innovation LLC of Charlottesville, Virginia, as the third-party contracted vendor to deliver the program. The Army Alliance (supporting Aberdeen Proving Ground) joined with partners Early Charm Ventures of Baltimore and Altus Engineering of Darlington, Maryland, and the Maryland Technology Development Corp. (TEDCO).

Above: County and state officials join Maj. Gen. Cedric T. Wins, commanding general, US Army Research, Development and Engineering Command; Maj. Gen. Randy S. Taylor, commanding general, US Army Communications-Electronic Command, and senior commander, Aberdeen Proving Ground; and Edgewood Chemical Biological Center Director Eric Moore, PhD, to cut the ribbon on Maryland's Defense Technology Commercialization Center. Lisa Swoboda, senior director, Office of Military & Federal Affairs, Maryland Department of Commerce, and a member of the award-winning DefTech team, is second from right.

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In a year and a half, DefTech created a state-specific database of defense-related patents and to date has matched more than 150 patents to the needs of its client businesses. In addition, the DefTech team provides training, support and mentoring to more than 40 client companies. DefTech has signed five patent licenses or Cooperative Research and Development Agreements (CRADAs) with the DoD labs, and five more companies have patent license agreements (PLAs) or CRADAs in the works.

Because of the pilot program's success, additional federal funding of $750,000 was awarded through the federal Economic Development Administration under its i6 Challenge grant program in December 2018 to continue geographical expansion. Additional network partners will increase accessibility for businesses and further enhance commercialization outcomes.

DefTech has created new opportunities for dialogue among government, industry, and innovators by reducing the barriers to meaningful interactions. By simplifying access to senior subject matter experts, the network demonstrates to entrepreneurs that federal intellectual property (IP) can be a viable part of creating and growing a business. DefTech and CCDC's partnership includes conducting workshops and teaching lab scientists and engineers how to pitch their ideas and inventions to commercial businesses and investors.

Plans are underway to provide seed funding for companies commercializing lab IP, a customized pitch program to connect lab scientists and local entrepreneurs, and new entrepreneurship resources at local community colleges.

DEFTECH TEAM MEMBERS

Amanda Hess, Lisa Swoboda, Jennifer White, Thomas Mulkern, AnnMarie Martin, Karen Holt, Gary Evans

NASA TECHNOLOGY BOOSTS BROWNSVILLE ECONOMY

National Aeronautics and Space Administration

NASA Johnson Space Center

In a South Texas town that will soon be launching commercial spacecraft, a partnership program based on federal laboratory technologies is launching start-up companies to support this emerging market.

Through the Rockets and Rigs technology partnership program, innovations developed by the National Aeronautics and Space Administration (NASA) are playing a central role in efforts to turn Brownsville, Texas, into a vital hub for commercial space industries.

Six new start-ups resulting from the program will have a direct impact on the economy of this town near the US-Mexico border. The potential market for one sensor technology company, for example, could be more than $100 million.

Brownsville's aerospace potential began its upward trajectory in 2014 after SpaceX, the company started by Elon Musk to provide commercial space launches, began building a spacecraft launch site there.

As part of the incentives to attract Musk's company, the US Economic Development Administration helped fund a research center at the University of Texas Rio Grande Valley (UTRGV) to build a workforce for the burgeoning commercial space economy and create start-ups that would contribute to its growth. This center's search for technologies to seed these start-ups led to a collaboration with NASA and the creation of the Rockets and Rigs technology partnership program.

Rockets and Rigs was designed to encourage the formation of start-ups to target the challenges faced by either the aerospace (Rockets) community or the energy industries (Rigs) community. During a 2018 event, NASA identified 26 technologies that addressed the technical challenges voiced by the Rigs community. The Rigs community reviewed the intellectual property presented by NASA and identified 14 technologies with high potential to have an impact on that industry.

Encouraged by this response, the Rockets and Rigs leadership — with the support of the city of Brownsville — scheduled a similar partnership event in 2019. They invited entrepreneurs, venture capitalists, representatives from both the aerospace and energy communities, and students from UTRGV to create companies that could be launched at the completion of the event.

© ISTOCK / ABDOUDZ

The event ended with the participants self-selecting into six start-ups that would have a market in the energy industry. These start-ups will be able to benefit from three years of licensing NASA technology with no licensing fee. Three start-ups are in the process of being incorporated in the state, and the NASA centers have already begun to initiate the start-up licenses.

Through the city of Brownsville's participation, additional initiatives have been launched. Expanding Frontiers, a nonprofit organization dedicated to the development of the commercial space industry in Brownsville, would not have been possible without the city's leadership. The success of the collaboration also contributed to the launching of NewSpace Capital, a space technology investment firm, in Brownsville.

Left to right: *Ramiro Gonzalez, Steven Gonzalez, Dr. Frederick Jenet, Helen Ramirez*

Above: *Hack-a-thon research on Pre-Treatment solution for Water Recovery could increase water recovery, prevent mineral scaling, and reduce brine volumes by half*

NOAA EXPANDS REACH OF SCIENCE ON A SPHERE

Department of Commerce
National Oceanic and Atmospheric Administration
Earth System Research Laboratory/Global Systems Division

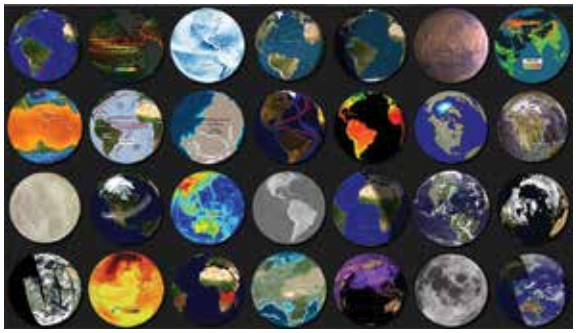
An interactive educational technology that has changed the way children learn about earth science is now available in two smaller-scale versions that are already expanding the technology's reach into schools and smartphones.

Science On a Sphere® (SOS), developed by the Global Systems Division (GSD) of the National Oceanic and Atmospheric Administration (NOAA), is a room-size interactive spherical display system seen by about 63 million viewers a year in more than 170 museums worldwide. The full-size SOS is visually impressive, provides distinctive educational experiences, and is extremely popular, but it is not easily portable and can be viewed only on location at a host site.

GSD developed the SOS Explorer™ and SOS Explorer™ Mobile, which use the same expansive data catalog as SOS, to reach a far greater audience of educators, students, small museums and the public.

SOS Explorer™, released in 2016, is a low-cost software system with museum-quality stability and usability that displays an interactive globe on a flat-panel computer or TV screen. It incorporates immersive virtual reality hardware, 3D beyond-Earth landmarks such as satellite locations and the aurora borealis, and flat mapping, which are not attainable with the room-size SOS. The SOS Explorer™ is reaching thousands of viewers per year through its 35 installations in museums and schools.

SOS Explorer™ Mobile is an interactive globe that can be downloaded to a mobile device. It has been downloaded more than 25,000 times for Apple iOS and Android since its release on Sept 1, 2019. GSD estimates that the app will exceed 50,000 downloads by the end of its first year.



Above: *SOS Explorer™ provides more than 115 popular Science On a Sphere datasets to users.*

SOS Explorer™ and SOS Explorer™ Mobile include more than 150 visualizations of data curated by scientists from NOAA and other institutions. Some of the most popular are near-real-time animations of satellite imagery of clouds, sea surface temperatures and ice cover.

SOS Explorer™ and SOS Explorer™ Mobile have clear advantages over other global display systems and the room-size SOS. Individuals can access these new technologies with their mobile devices, from almost anywhere, without having to visit a large science museum as required by the room-size SOS. These new systems can display high-resolution, interactive, dynamically moving maps, and include virtual reality add-ins as well as the ability to create educational tours.

SOS Explorer™ and SOS Explorer™ Mobile also make exploration and investigation possible as a single-user experience, which is difficult if not impossible to achieve in a museum environment. Finally, the price point is very low to zero, making it easily accessible to most institutions, the public and students.

Left to right: Eric Hackathorn, Hilary Peddicord, Beth Russell, Jonathan Joyce and Keith Searight

USU WORK HELPS CONTROL HENDRA, NIPAH VIRUSES

Department of Defense
Uniformed Services University of the Health Sciences

Research at the Uniformed Services University of the Health Sciences (USU), analyzing two potentially fatal viruses that can be transmitted from livestock to humans, has resulted in a vaccine to prevent infection in horses and a treatment for humans who have been exposed.

Hendra and Nipah viruses are disease-causing agents that emerged in the 1990s causing serious outbreaks in humans and livestock in Australia, Bangladesh, India, Malaysia and Singapore. The fatality rate for infected humans is 40% to 100%.

More than 700,000 doses of the USU-originated equine vaccine for the Hendra virus have been administered to nearly 170,000 horses since 2015, and no vaccinated horse has been infected with Hendra. Since 2010, 14 people have received USU-developed high-dose antibody therapy on an emergency use basis because of high-risk exposure to Hendra or Nipah, and all have remained well. A human vaccine is also in development.

In 2012, the HeV-sG vaccine was licensed to Zoetis, an animal health products company now based in Parsippany, New Jersey, through the Joint Office of Technology Transfer of USU and the Henry M. Jackson Foundation for the Advancement of Military Medicine (USU-HJF JOTT). This partnership led to the approval of the Equivac®HeV equine vaccine in Australia in 2015. This vaccine, the only antiviral approach for Hendra infection, is a One-Health measure that breaks the cycle of virus transmission from horses to humans.

Above: *Equivac®HeV, sold by Zoetis, prevents Hendra infection.*

Left to right: *Professor Christopher Broder, Dr. Mark Scher*

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The m102.4 antibody, also developed at USU, is the only known treatment for humans exposed to or infected with Nipah or Hendra virus. An antibody is a protein that binds to a specific target; m102.4 specifically targets and neutralizes Hendra and Nipah viruses.

Technology transfer from USU, first with the government of Queensland, Australia, and then India, provides access to m102.4 antibody for people exposed to the Nipah or Hendra virus. This T2 story started in 2010, when a mother and daughter were exposed to Hendra in Australia, and USU provided the antibody under a compassionate-use agreement.

Subsequent agreements allowed the Queensland government to conduct a clinical study and to produce the antibody for future use in Australia or in other locations. When a Nipah outbreak occurred in Kerala, India, in May 2018, the USU-HJF JOTT coordinated a transfer of the antibody from the Queensland stockpile to the Indian Council of Medical Research for compassionate-use purposes.

Another USU license was issued in 2018 to Baltimore-based Profectus Biosciences Inc. for the development of a Nipah/Hendra human vaccine. The Coalition for Epidemic Preparedness Innovations has awarded up to $25 million to Profectus for clinical development and evaluation; the US National Institute of Allergy and Infectious Diseases and global health organization PATH have also provided support.

CATALYST SWAPS CO_2 FOR ETHANOL AND CLEANER AIR

Department of Energy
Oak Ridge National Laboratory

The ongoing commercialization of biowaste recycling technology developed by Oak Ridge National Laboratory (ORNL) could mean cleaner air and more ethanol available for use in fuel and other products.

Many industries and applications produce CO_2 in high purity yet do not recycle it, instead releasing it into the atmosphere. Commercialization of ORNL's technology by New Orleans-based start-up ReactWell offers these industries an inexpensive and efficient means of recycling their byproduct CO_2 into ethanol.

The technology is an electrochemical catalyst that can be applied to any industry or application with a CO_2 byproduct. The ethanol produced can be used for fuel and other useful products, such as beverages and industrial or household cleaners. The process combines CO_2 with water and electricity to make ethanol in a single-pot reaction at room temperature and pressure. Unlike competing processes, the ORNL catalyst uses no rare earth elements, which are expensive and difficult to acquire. Notably, the simple reaction eliminates the need to purchase or produce additional hydrogen, which could lead to significant savings for refineries.

ORNL's technology boasts a total energy efficiency of about 22%, translating to an electrical cost of about $1.98 to synthesize one gallon of ethanol. The costs are competitive with those required to convert corn into ethanol, even before attempts to scale up the CO_2 conversion process.

The invention was developed on a small scale through ORNL's Technology Innovation Program. The lab granted an exclusive license to ReactWell, a specialty reactor systems development company that serves the energy, chemical, oil and gas, and petrochemical industries. The company is now a CRADA partner on a Department of Energy Technology Commercialization Fund grant awarded to ORNL for this effort.

ReactWell's commercialization plans start with introducing this waste-to-fuel technology to niche markets and eventually scaling up to the ethanol fuel industry within the next decade. If successful, this transfer effort will be highly impactful, helping to improve energy

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conversion methods worldwide for cleaner, more efficient oil and gas, chemical, and bioenergy production.

One potential application for this technology is to allow renewable energy plants to take advantage of extra electricity when available by making and storing ethanol for later use. Successful commercialization also could affect the use of renewable fuels in cars and long-distance transportation vehicles by providing an additional source of ethanol that does not rely on crops for production.

Finally, geothermal fields operated by the Department of Defense (DoD) could use the technology to produce fuels in remote locations locally during times of war, distress, or national emergency. In fact, this licensing effort has also led to ReactWell entering into a CRADA with the DoD.





Left to right: *Dr. Adam Rondinone, Dale Hensley, Dr. Peter Bonnesen, Dr. Edna Gergel, Brandon Iglesias*
Not pictured: *Dr. Eugene Cochran, Dr. Yang Song, Marc Filigenzi*

Above: *Representatives from ORNL gather with ReactWell CEO Brandon Iglesias (seated, left) at the license signing ceremony in May 2018.*

HOME TEST HELPS KEEP MALE INFERTILITY PRIVATE

Department of Energy
Sandia National Laboratories

For most men, infertility is a private issue. Now, thanks to a discreet home testing system based on technology from Sandia National Laboratories, it can stay that way.

After a Sandia research team developed SpinDx™, a portable lab-on-a-disc diagnostic device with a range of potential applications, two of the platform's lead inventors founded Sandstone Diagnostics Inc. in Livermore, California, to commercialize the technology.

Sandstone's handheld, battery-powered centrifuge.

Left to right: *Dr. Greg Sommer, Tristan Mahyera*
Not pictured: *Dr. Ulrich Schaff*

Above: *The Trak® Male Fertility Testing System is an at-home kit that enables men to measure, track, and try to improve their sperm count in the comfort of home.*

Sandstone's first commercial application is the Trak® Male Fertility Testing System, which is based on the SpinDx technology it licensed in 2012. Trak offers a new fertility approach by enabling men to measure, track and try to improve their sperm count at home to boost a couple's chances of conception.

More than 3,500 units have been sold with very little marketing. Sandstone's educational website on male reproductive health has received more than 300,000 unique monthly views. More than 20,000 men have completed Trak's fertility risk assessment tool. This large data set has helped strengthen the link between male fertility status and men's overall health, and has been scientifically presented to the American Urological Association.

Research suggests the average sperm count has plummeted by more than 50% since the 1970s. Most fertility products and treatments focus on the female partner, despite men contributing to up to half of infertility cases. Gold standard laboratory semen analysis is awkward, embarrassing and often inaccessible for men. On average, men are not even tested until a couple has been trying to conceive unsuccessfully for 18 months.

Trak is a private, discreet and complete home testing system that is as accurate as the lab and does not require a prescription. It is not only a testing device, but an entire system that includes educational content to help men change their health habits and lifestyle to improve their reproductive success.

Originally developed for biodefense applications with funding from a Laboratory Directed Research and Development project and the National Institute of Allergy and Infectious Diseases (NIAID), SpinDx has the potential for both medical and non-medical applications ranging from detection of markers of infectious diseases to food and water safety testing.

The hand-held, battery-powered system uses 4-inch diameter plastic DVD-like discs. The user places a small test sample (of blood or semen, for example) in the disc, and a small motor spins it. The centrifugal forces created by spinning separate the components of the sample for quick analysis.

Sandstone continues to refine and develop the technology, which it now calls CentriFluidics™. The company has applied its technology to additional diagnostic areas, including infectious disease. Its second product, the Torq™ zero delay centrifuge system, enables immediate blood plasma stabilization at the point of collection.

FDA MOBILE APP PROMOTES FOCUS ON PATIENTS

Department of Health and Human Services
US Food and Drug Administration

An open-source mobile technology created by the Food and Drug Administration (FDA) will improve the process of collecting patient-reported outcomes for research and, in turn, will help the agency promote patient-focused product development.

In recent years, the FDA has made it a priority to consider patient views and experiences when examining complex issues involving the regulation of medical devices and their use by patients. However, before November 2018, no publicly available mobile platform existed to recruit patients, get their consent and collect patient-reported data for clinical research while meeting FDA regulatory requirements with respect to data integrity and federal standards regarding patient privacy.

The FDA MyStudies platform is the mobile technology accompaniment to the agency's other efforts aimed at incorporating patient voices and experiences into product development and regulation. It was developed by the FDA and private sector partners, but open-source code and technical documentation (for Apple or Android frameworks) are being released to the public, so the app and patient data storage system can be reconfigured by organizations conducting clinical research.

Since the FDA MyStudies app's release to the public in 2018 via the software repository GitHub, 25 groups across the nation have cloned it for their purposes. Currently, the app is being rebranded for two research projects: one in collaboration with the Patient-Centered Outcomes Research Institute (PCORI), and the other in collaboration with the Crohn's & Colitis Foundation.

The FDA MyStudies app is designed to help collect real-world data directly from patients and enable data linkage to a variety of sources, such as clinical trial data capture systems, electronic health records, insurance claims, product and disease registries, and potentially patients' other digital health technology such as wearables. While

serving as a patient source of data, these valuable data streams can inform clinical trial development and real-world evidence studies as well as potentially lead to new medical product development and inform regulatory decision-making.

Funding for the FDA MyStudies app was initiated by a $2 million grant from the US Department of Health and Human Services' Patient-Centered Outcomes Research Trust Fund. Boston-based Harvard Pilgrim Health Care Institute was chosen to build the app, with Boston Technology Corp. (BTC) of Marlborough, Massachusetts, as the mobile app developer and Seattle-based LabKey Corp. as the infrastructure provider. The FDA partnered with the Kaiser Permanente Washington Health Research Institute in Seattle to test the app's functionality and engagement in a 2017 pilot study that explored medication use and health care outcomes of pregnant women.

The FDA MyStudies app has the potential to support real-world evidence studies by capturing patient-reported outcomes, while expanding the range of endpoints available for study and improving the comfort and convenience for clinical trial participants.

Left to right: *Dr. David Martin, FDA; Zachary Wyner, Harvard Pilgrim; Juliane Reynolds, Harvard Pilgrim; Dr. Jeffrey Brown, Harvard Pilgrim; Adam Rouch, LabKey; Shyam Deval, BTC; Shanthala Rao, BTC*
Not pictured: *Dr. Sascha Dublin, Kaiser Permanente; Dr. Chayim Herzig-Marx, Harvard Pilgrim; Dr. Susan Hert, LabKey; Dr. Predrag Klasnja, Kaiser Permanente; Linda Kiel, Kaiser Permanente; Ladia Albertson-Junkans, Kaiser Permanente; Dr. Christina Chambers, University of California San Diego*

USDA Agricultural Research Service

ARS INNOVATION FUND AWARDS MILLIONS FOR T2

Department of Agriculture
Agricultural Research Service

Three years after its inception, a competitive funding program created by the US Department of Agriculture's Agricultural Research Service (USDA ARS) has awarded nearly $3 million to promote technology transfer of the laboratory's research.

The Innovation Fund, created in 2016 from licensing revenue by the laboratory's Office of Technology Transfer (OTT), had completed nine rounds of funding at the time of award submission. Of 367 applications received, 117 projects have been awarded for a total of $2.9 million; the typical grant is for $25,000. The funded projects are wide ranging and include developing a new website, conducting a stakeholder perception study, enhancing an animal germplasm database to be more user-friendly, purchasing equipment for scale-up testing, building or testing a prototype, and conducting field trials.

The two-page application for funding takes less than 20 minutes for a scientist to complete. An evaluation committee assesses each application based on seven criteria; the greatest emphasis is on the potential impact of funding on enhancing the commercial potential of an agricultural solution and/or the adoption of research findings by industry, academia and other stakeholders. Projects that are closest to adoption are most likely to get funded.

In one example, a scientist received $25,000 to improve the taste of a low-calorie snack bar that provides nutrients missing in a typical Western diet. Because of taste issues, no company was interested in commercialization. Taste-testing panels revealed that bars containing fruit were more popular than others and that the texture of the bar was almost as important as flavor for acceptance. After the bar's taste and texture were improved, negotiations for licensing the patented bar began; the potential licensee anticipates net sales of $15 million in the next five years.

Funded applicants have about 18 months to complete their proposed projects and then three months to submit their final reports to the OTT. For projects that are not funded, two members of the OTT call the scientists and offer comments and feedback on their proposals. As a result of this feedback, many of the scientists revise and resubmit their projects, most of which are then funded.

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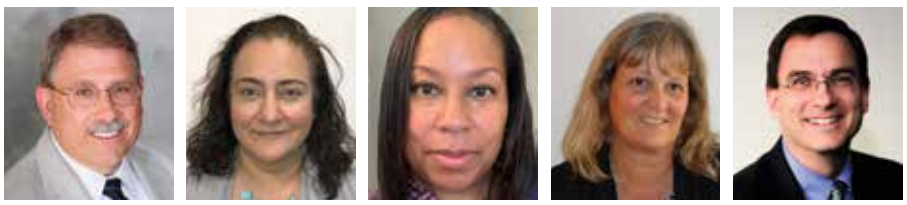
The OTT aims to track the progress and evaluate the results of each round as projects are completed and reports submitted. At the time of award submission, it had analyzed the first of the nine rounds of funding. That round resulted in two scientific papers; two prototypes; $420,000 of extramural funding for one project after a market and perception study; one example of equipment that can be used in other projects at ARS as well as the existing project; one example of customer-friendly website enhancements; and one example of consolidating rights and entering into an exclusive license to commercialize a new technology.



Left to right: *Dr. Robert Griesbach, Mojdeh Bahar, Diana Halsey, Dr. Pamela Starke-Reed, Dr. Brendan Niemira*
Not pictured: *Dr. Robert Matteri*

NAVY EVENT CHAMPIONS TWO-WAY TECH TRANSFER

Department of Defense
Naval Undersea Warfare Center Division Newport

At the Navy's annual Advanced Naval Technology Exercise (ANTX) event, technology transfer flows both ways. Non-military organizations might see commercial potential in a Navy innovation, but the Navy might see potential in an academic or industry innovation as well.

ANTX, the brainchild of The Naval Undersea Warfare Center Division Newport (NUWC Newport), is a strategic partnering and technology transfer (T2) engagement event that began in 2015 and has expanded every year in scope and scale. ANTX provides a collaborative, low-risk environment for technology companies and the Navy to demonstrate rapidly developed prototypes in subsurface, surface and air exercises.

The event provides an opportunity for industry, academia, and nonprofit entities to exercise their technology for Navy use and, in turn, an opportunity for non-military entities to examine Navy-developed technologies for commercial applications. With the goal of creating long-term relationships among warfighters, stakeholders, and technology developers, ANTX's "collaborate and innovate" environment lowers the barrier of entry for non-traditional developers into the defense market.

ANTX themes have included communications for command and control, battlespace preparation in a contested environment, human-machine interaction, and undersea security.

Developers that have been part of ANTX-facilitated collaborations include:

SeaDrone. After learning about the Inspector sensor technology demonstrated by Mountain View, California-based SeaDrone at ANTX 2019, NUWC Newport purchased the technology for experimental use. The SeaDrone Inspector 3 is a multipurpose system ranging from basic ship maintenance and security to advanced unmanned underwater vehicle (UUV) solutions. NUWC Newport's Platform and Payload Integration Department will be using this scientific equipment to evaluate its application for submarines to leave port without needing to spend the time, money and risk of putting divers in the water.

PowerDocks Blue Isles. This small business based in Newport, Rhode Island, demonstrated its floating power grid at ANTX 2017. The company returned for ANTX 2018, partnering with Teledyne Marine of Daytona Beach, Florida, in an exercise that started with the Teledyne Oceanscience Z-Boat Autonomous Surface Vessel launching from PowerDocks' autonomous power microgrid platform.

General Dynamics Electric Boat. This Groton, Connecticut, company demonstrated a stackable launcher at ANTX 2017. This led to a fiscal 2018 internal investment by NUWC Newport's Platform and Payload Integration Department to collaborate further with Electric Boat in developing the concept.

The University of Texas. At ANTX 2018, NUWC Newport and the University of Texas began a collaboration on a device that created sound from heat using carbon nanotube fibers. NUWC engineers developed housing that would work underwater, and a novel thermophone was developed. Placed inside a small UUV, the technology essentially becomes a non-mechanical transducer that can produce sounds at a low frequency. Potential applications continue to be explored for this technology, which was rated as the No. 1 innovation at ANTX 2018.

Above: ANTX team members in the front row include Heather Hopkins (far left), Ryan Beatley (second from left), Valerie Larkin (third from left), Mary Sylvia (fourth from left), and Jeffrey Gray (far right). In the back row, second from left, is ANTX team member Dr. Peter Hardro.

Not pictured: Christian Schumacher, James Kasischke, Jeffrey Prater, Scott Vertefeuille, Molly Magee

Above: ANTX 2019 featured the winner of a prior innovation event called "Hack the Range" in which participants developed ideas for securing Navy test ranges.

ORNL SCIENTISTS COMPETE FOR T2 OPPORTUNITIES

Department of Energy
Oak Ridge National Laboratory

A competitive commercialization program at Oak Ridge National Laboratory is engaging laboratory researchers in technology transfer (T2), improving the lab's ability to identify internal projects most likely to attract licensees and generating millions of dollars in new licensing revenue.

In the past five years, ORNL's two-year Technology Innovation Program (TIP) has invested about $7.5 million from the laboratory's royalty revenues toward the commercialization of 34 new technologies. So far, the deals emerging from TIP have generated $2.4 million in licensing revenue, recouping a healthy portion of ORNL's investment.

That investment has yielded 24 commercial licenses and two shorter-term options to license. Five of the technologies have multiple licensees, and partners range from Fortune 100 companies to early-stage start-ups. In several cases, multiple companies have vied for a single license.

More importantly, TIP gives new technologies a significant boost on their way to becoming commercial products with substantial energy-related benefits.

The TIP competition begins with an internal call for brief pre-proposals. An ORNL committee, made up of technical and commercialization leaders, reviews about 30 pre-proposals and selects the top 15 projects. The principal investigators (PIs) for those projects work with a commercialization manager (CM) assigned by the Technology Transfer Office (TTO) to develop full proposals, on which the final five selections are based. Each one receives up to about $200,000 in initial funding, drawn from the laboratory's royalty revenues.

Toward the end of Year 1, TIP hosts its Technology Innovation Showcase to introduce the TIP technologies to prospective licensees. The showcase format creates a sense of urgency and heightens the perceived value of each technology, which increases companies' seriousness in considering the licensing opportunity. Prospective licensees hear technology presentations, meet one-on-one with PIs and CMs, and learn about the licensing process and evaluation criteria, increasing the quality of applications and commercialization plans.

After the showcase, prospective partners competitively apply to commercialize the TIP technologies, the TTO judges them according to established criteria, and the companies with the highest quality commercialization plans are offered licenses.

TIP teams whose technologies are successfully licensed may then compete for Year 2 funding for further research and development in partnership with the licensee.

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Technologies that are not licensed in Year 1 can be included in future showcases, as the investigators gain more insight about market needs.

TIP helps the TTO identify the technologies with high commercial potential from among the 1,200 inventions in its portfolio. The program encourages researchers — who frequently engage with industry and represent one of the best pathways for identifying quality licensees — to be more involved in the technology transfer process. And it allows researchers to focus their time on technologies best suited for commercialization.

Above: TIP creates a strong online presence to promote its Technology Innovation Showcase. This screenshot shows the website for the 2019 event, posted at https://tech-showcase.ornl.gov/.

Left to right: Dr. Michael Paulus, Dr. Thomas Zacharia

EXPLORATORY LICENSE ALLOWS INDUSTRY TEST DRIVES

Department of Energy
Pacific Northwest National Laboratory

Potential industry partners who are interested in Pacific Northwest National Laboratory (PNNL) technology but are intimidated by the prospect of a standard licensing agreement now have the option to test-drive the technology before making a bigger commitment.

The laboratory's Exploratory License is a low-cost, limited-term research license that lets a company use PNNL technologies for six months with the option to convert to a standard royalty-bearing license after that. Laboratory records indicate that 70% of the companies that complete the trial period have gone on to sign a standard license.

Standard federal licensing agreements can take months to negotiate and can cost tens of thousands of dollars in fees, which can be a deterrent for some companies. Standard licensing also requires potential licensees to understand the technology being transferred before the agreement is finalized, which can seem daunting, especially if potential benefits aren't clearly demonstrable from the outset.

PNNL established its Exploratory License in 2015 to allay those concerns. The lab's Technology Transfer Office and Legal Department can execute the agreement in about two weeks. The two-page application form takes just minutes to fill out, with only basic information required. The terms are fixed, so no drawn-out negotiation is required, and the price is set at $1,000 to ensure a serious level of interest while also being manageable and low-risk for most companies.

Exploratory License recipients are assured that the technology of interest will not be exclusively licensed to any other company during the trial period. Licensees are required to provide a progress report on any new advancements made to the technology during the exploratory time frame, which benefits the lab.

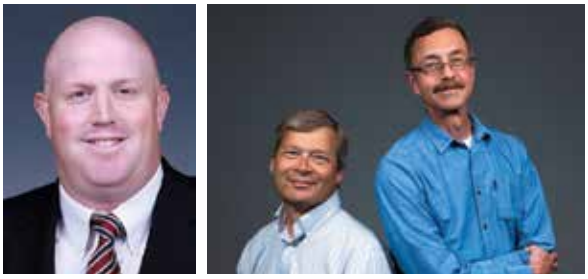
The exploratory phase allows the prospective partner to become comfortable with PNNL, its technology developers and its commercialization approach. This makes pursuing a standard licensing agreement far less intimidating.

These low-cost, short-term licenses have generated significant interest. Of the first 20 Exploratory Licenses executed by PNNL, seven were active when the application for this award was submitted, and nine of the remaining 13 had been converted into full licenses.

One success story involves Perceptive Sensor Technologies (PST) LLC, which provides noninvasive liquid inspection technologies and used the exploratory period to verify that PNNL offered a technological platform capable of the high-sensitivity measurements the company needed. After the trial period ended, the company signed a standard licensing agreement that has resulted in a commercial product called FluIDTM. PST expects to create more than 150 new jobs in the next five years to support anticipated revenue growth of more than $100 million made possible by this technology transfer effort.

Above: *A PNNL scientist examines electrolyte samples after exposure to 50°C temperature. The conventional vanadium electrolyte (vial on the left) has destabilized, forming solid precipitates that cause battery failure. PNNL's bi-additive electrolyte (vial on the right) remains stable from -5 to 50°C (an 80% improvement).*

Above: *An image of one of Cynash's products, created based on the transfer of a suite of PNNL cybersecurity tools that was initiated by an Exploratory License.*



Left to right: *Derek Maughan, Peter Christensen, and David Long.*

NCI'S T2 TRAINING BENEFITS LAB AND POSTDOCS

Department of Health and Human Services – National Institutes of Health
National Cancer Institute

A technology transfer (T2) training and mentoring program for postdoctoral students at the National Cancer Institute (NCI) is increasing T2 engagement with the laboratory as well as expanding career options for the trainees.

The Technology Transfer Ambassadors Program (TTAP) has made a significant impact on technology transfer efforts across NCI and increased internal engagement so much that the 2020 program is being offered and adopted across the National Institutes of Health (NIH).

TTAP offers professional development in invention analysis, commercialization and entrepreneurship. Over one year, five to eight hours per week of TTAP training augments each postdoc's research activities.

TTAP has received positive feedback and results since it was first implemented in 2016. However, to further enhance the experience, organizers conducted surveys throughout the program and exit interviews with all Ambassadors at the end of each year. Based on Ambassador feedback, the entire training curriculum of TTAP was restructured for 2019.

The 2019 TTAP curriculum included a new "Technology Transfer Boot Camp," a series of intensive hands-on training sessions to kick-start the program and equip Ambassadors with skills immediately applicable to their T2 training. Additionally, the program organizers developed a "Perfecting Your Pitch" workshop and "Pitch Practice" sessions for Ambassadors to learn how to effectively communicate a technology's value to a business audience.

During the boot camp, Ambassadors go through the T2 process and receive training in targeted marketing, commercial analysis, invention analysis and patenting decision-making. Subject matter experts — such as federal economic development professionals, investors, entrepreneurs and a communications consultant — share experiences and insights that Ambassadors would not otherwise encounter. After the boot camp, T2 managers and Ambassadors meet monthly for in-depth discussions of T2 topics.

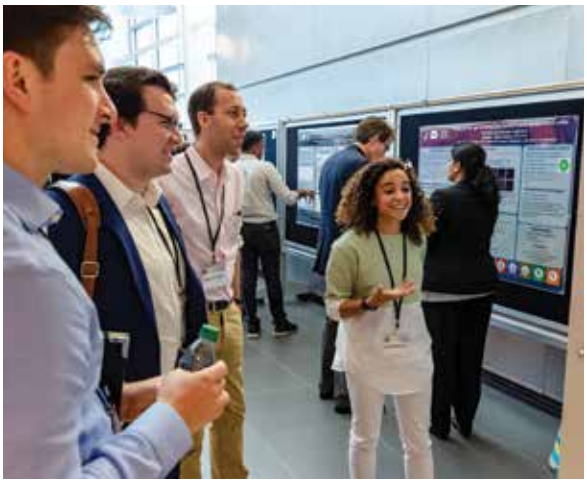
These TTAP components supplement an Ambassador's technology transfer training with networking, discovery-to-market knowledge, communication skills and the opportunity to apply those skills.

Successful outcomes include multiple invention disclosures and transactional agreements initiated by Ambassadors, dozens of analyses and presentations informing NIH patent investment decisions, and improved marketing campaigns for NIH technologies.

One Ambassador used skills gained in TTAP training (competitive analysis, effective communication, etc.) to triage his research for a prospective new invention. The Ambassador submitted an invention disclosure to NCI's Technology Transfer Center, and patent protection was pursued.

During another Ambassador's T2 training, a competitive market analysis was conducted for active NCI technologies outside the Ambassador's field of expertise. The conclusions from the Ambassador's analyses broadened another lab's perspective on NCI technologies and formed the basis for submission to a seed-investment program.

TTAP is career-influencing. Since participating in the program, multiple Ambassadors have transitioned their careers into technology transfer and related professions such as patent agents, clinical and corporate contract resource managers at universities, and federal health science analysts.



Dr. Delphine Lissa from TTAP 2016-17 presents her tech poster at NCI's 2019 Technology Showcase. Behind Dr. Lissa is Dr. Sarwat Naz from TTAP 2017-18, also presenting a poster as an Alum and Senior Ambassador for the 2019 TTAP.

Left to right: *Dr. Laura Prestia, Dr. Rose Freel*
Not pictured: *Dr. Abritee Dhal, Dr. Taryn Dick*

CRADAS DRIVE SENSOR-BASED IRRIGATION SOLUTION

US Department of Agriculture
USDA Agricultural Research Service

For the Department of Agriculture's Agricultural Research Service (ARS), the road to a better autonomous irrigation management system has been paved with CRADAs.

The decade-long quest for an autonomous technology-based solution to the irrigation challenge of an increasingly limited water supply was made possible by multiple Cooperative Research and Development Agreements (CRADAs) between ARS and key industry players. The result was the proprietary Irrigation Scheduling Supervisory Control and Data Acquisition (ISSCADA) system. (See page 9 for more details about the outcomes and benefits of the partnerships, as well as the list of individual team members.)

ARS designed a wireless sensor network of noncontact, crop infrared thermometers (IRTs) with a narrow field of view to replace the miles of wire previously required to place IRTs on a moving irrigation system to scan the crop for water stress. ARS worked with CRADA partner Dynamax Inc. of Houston to commercialize the sensor and wireless network system for use in irrigation management. This effort resulted in the commercial introduction of the Dynamax SapIP-IRT in 2016.

Available soil water sensors were inaccurate and required long wires, so ARS developed and patented an accurate soil water sensor through two CRADAs and two SBIR grants with partner Acclima Inc. of Meridian, Idaho. ARS then worked with Acclima and other ARS laboratories through a third CRADA to develop and commercialize a network composed of wireless nodes that gather data from multiple soil water sensors and gateways that collect data by radio from multiple nodes and transmit it to the internet cloud through cellular networks. Beta tests were conducted with the ARS system in 2016-18 and with the first commercial system in 2019 in Idaho, Maryland and three other southeastern US states, as well as Jordan and Uzbekistan. The node and gateway system is inexpensive and solar powered, and the data can be accessed from the cloud by the ISSCADA system.

ARS established relationships with other CRADA partners to supply the subsystems to Valmont Industries Inc. of Valley, Nebraska, for use in the integrated ISSCADA system, which was transferred to Valmont through three CRADAs and a patent license. Field testing — the focus of the third Valmont CRADA — with a variety of crops (corn, cotton, potato, sorghum and soybean) demonstrated the effectiveness of the system in substantially increasing the crop yield per unit of irrigation water applied while surpassing countywide average yields where tested.

Uniform irrigation can oversupply water to some parts of a field, causing losses of nutrients to deep percolation, while undersupplying other, drought-prone parts. The site-specific ISSCADA system increases crop water productivity and nutrient use efficiency while cutting pumping costs by reducing unneeded irrigation, by applying water where and when it is needed in the field, and by decreasing risk associated with regulated deficit irrigation that can be used to increase crop water productivity.

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JACK L. OWSLEY III: ONE ORTA, MANY SUCCESSES

Department of Defense
Air Force Research Laboratory Sensors Directorate

When Jack L. Owsley III joined the Air Force Research Laboratory Sensors Directorate (AFRL-RY) as an Office of Research and Technology Applications (ORTA) representative, he had no background in technology transfer (T2) and no incumbent to show him the ropes. Just over a year later, the rookie leads the AFRL in all T2 impact categories: number and quality of inventions, patents, invention disclosures, and agreements.

In his short tenure as the ORTA and T2 manager, Owsley executed 20 new Cooperative Research and Development Agreements (CRADAs) and six information transfer agreements, managed 49 active agreements and six patent license agreements, and is working on five new patent license agreements. He also completed and fully executed 203 distinct CRADA actions, including 26 new multitask CRADAs, and 49 individual joint work statements. And he is directly responsible for 38 invention disclosures, 40 patent applications and 15 patents issued.

These are singularly exceptional contributions for a relative newcomer to technology transfer in an organization with 1,300 scientists, engineers and support staff, and just one ORTA, according to Abby Boggs, lead Air Force ORTA, Air Force Technology Transfer Program Office, AFRL.

"Most ORTAs have a lot more staff," Boggs said. "Jack went from not knowing the job and the environment to dramatically increasing the number of T2 agreements coming out of AFRL-RY and being a T2 leader among AFRL labs. To say he is doing an excellent job is an understatement."

As a result of Owsley's leadership, the combined value of leveraged effort from collaborators for CRADA actions executed in fiscal 2019 was estimated at $8.6 million. He managed more than $10 million in partner contributions of personnel time, materials, travel costs and, in some cases, direct funding.

In addition to serving as ORTA, Owsley is responsible for AFRL Sensors Directorate's Alliance program, for which, in fiscal 2019, he managed 18 memorandums of agreement and understanding. The AFRL Sensors Alliance program represents more than $371 million in science and technology activities, with more than $1.5 million supporting direct collaboration funding.

The rookie ORTA displayed his innovative side when he negotiated the first-of-its-kind joint ownership agreement for the Air Force between the United Kingdom and the United States. Other prime initiatives include organizing the first labwide T2 training with national DoD licensing partnership intermediary TechLink and the first-ever Innovation Discovery Event for RY. He also established two Air Force-wide non-disclosure agreements with world leaders in microelectronics design tools, giving the lab access to companies' intellectual property to enhance collaborations.

> Owsley's technology transfer achievements have been exceptional, particularly given that he is a relative newcomer to T2 and the sole ORTA in an organization with 1,300 scientists, engineers and support staff, said Abby Boggs, lead Air Force ORTA.

Owsley routinely accomplishes many critical tasks, such as reviewing and delegating patents to be reviewed by government scientists and engineers (S&E). He first reviews the patent to determine if it is indeed applicable for AFRL-RY S&E to review, then identifies the appropriate reviewers to review it. For this task alone, he has reviewed more than 300 patents this year.

JASON MARTINEZ: GETTING CREATIVE WITH CRADAS

US Department of Energy
Sandia National Laboratories

Shortly after Jason Martinez became a Cooperative Research and Development Agreement (CRADA) specialist at Sandia National Laboratories in June 2013, he met with a group of principal investigators at an open poster session and discovered that none of them had heard of a CRADA.

That experience inspired Martinez to develop and implement Sandia's first CRADA Strategy. Since its implementation in 2015, the CRADA Strategy has helped the Sandia CRADA portfolio grow and set records each year.

The strategy generates growth opportunities through education and outreach; builds, manages and leverages relationships across organizational boundaries; and promotes CRADAs as a mechanism to harness the innovation of industry and enhance laboratory capabilities. A big part of the strategy involves educating researchers and managers about CRADAs as an asset to advance Sandia's mission while facilitating technology transfer (T2) in ways that will benefit the US economy.

Martinez has shared his experience and the success of Sandia's CRADA Strategy with other Department of Energy (DOE) laboratories through the Technology Transfer Working Group (TTWG). He has also taken a temporary assignment at SLAC National Accelerator Laboratory, where he developed tools and a strategic plan for that laboratory's T2 program. He also chaired a working group to propose changes to the CRADA DOE Order to bring consistency to contracts and statements of work.

One example of Martinez's creativity and innovation in transferring a specific technology was with the ongoing New Jersey Transit Corp. (NJT) TRANSITGRID Project, a first-of-its-kind electric microgrid for transportation, able to supply power during storms or other times of significant power failure. The project was conceived after Superstorm Sandy, which caused nearly $70 billion in damage in 2012.

Given the challenges inherent in balancing state and federal regulations, innovation was required for Sandia, a federal laboratory, and NJT, a state agency, to negotiate the terms of the $1 million umbrella CRADA. Multiple mechanisms and activities were used to facilitate the technology transfer, including a memorandum of understanding (MOU), a CRADA and a variety of funding sources. Although he had heard from other labs that the requirements of working with a state entity would be so burdensome as to be almost impossible, Martinez accepted the challenge, persevered, and came to an agreement on the CRADA terms and conditions, allowing the contract to be finalized.

> Martinez's CRADA Strategy generates growth opportunities through education and outreach, builds relationships across organizations, and promotes CRADAs as a means of harnessing industry innovation and enhancing laboratory capabilities.

The project continues to move ahead, with NJT announcing $46 million in funding from the Federal Transit Administration in June 2019 for the distributed-generation portion of the NJT TRANSITGRID project. Those funds are being matched with $15.2 million from the New Jersey Transportation Trust Fund Authority. None of the work performed under the CRADA would have been possible without Martinez's ability to find creative solutions to meet the requirements of both the federal government and the New Jersey Constitution.

DR. PAUL KEARNS: PREPARED FOR IMPACT

US Department of Energy
Argonne National Laboratory

Elevating the impact of its work is a priority for the US Department of Energy's Argonne National Laboratory, and Laboratory Director Paul Kearns has vastly increased Argonne's impact in just a few years through a metamorphosis of the laboratory's technology commercialization activities.

Inspired by Kearns' vision, the laboratory has taken a strategic approach to developing highly productive partnerships, particularly with industry. After becoming interim laboratory director in January 2017, Kearns led the establishment of a new laboratory directorate, called Science and Technology Partnerships and Outreach (STPO), to handle ongoing commercialization activities. The laboratory has focused on more technology licensing, Cooperative Research and Development Agreements (CRADAs), and individual Strategic Partnership Projects (SPPs).

Today, Argonne researchers are encouraged and supported to find new avenues for engagement, and the laboratory's value as a driver of technology commercialization is recognized by Department of Energy (DOE) leadership and key industry stakeholders. This is evidenced by the successful InnovationXLab: Artificial Intelligence event hosted by Argonne in October 2019 as part of the DOE's InnovationXLab series.

The laboratory has put into place a laboratory-embedded entrepreneurship program and a laboratory commercialization council. It also recently set up a second campus in downtown Chicago to better connect with new partners in one of the most fertile innovation ecosystems in the world.

One of the most important recent successes involved the laboratory teaming with AT&T on a climate resiliency project that is helping the communications company better anticipate, prepare for and adapt to the impacts of climate change and severe weather events. The initial CRADA focused on climate resiliency in the southeastern US, but ongoing discussions are likely to lead to an expanded national scope.

Under Kearns, efforts to promote commercialization through entrepreneurship have included the Chain Reaction Innovations program, in which fledgling companies receive access to laboratory resources and expertise for two years. The program also involves coaching these entrepreneurs in marketing their businesses to investors. At the time of this award nomination, the program had just graduated its first cohort of entrepreneurs, and many had already secured the next round of capital investments.

Kearns has also made Argonne a destination for industry players who are curious about the laboratory's key capabilities. Automotive and consumer electronics companies have been particularly interested in the laboratory's battery portfolio, which includes the pioneering nickel-manganese-cobalt (NMC) cathode technology used in many electric vehicles, such as the Chevrolet Volt and Bolt. In June 2017, Argonne hosted Battery Industry Day, when more than 100 industry representatives came to the lab to learn about Argonne's energy storage technologies and develop networks. A similar event for battery recycling technologies was held in October 2019.

> Under Kearns' direction, Argonne has taken a strategic approach to developing productive partnerships, particularly with industry. This approach started with the establishment of a new laboratory directorate to handle commercialization activities.

With the introduction of these activities and the elevation of STPO to a separate and coordinating directorate, technology commercialization has never been a more important priority at Argonne.

DR. ROBERT GRIESBACH: A CAREER OF CONNECTIONS

USDA Agricultural Research Service

Colleagues say one of Robert Griesbach's greatest strengths is his ability to see connections where others see dissonance. This unique ability has made Griesbach an effective champion of technology transfer (T2) at the US Department of Agriculture (USDA) and throughout his extensive involvement with the FLC.

Griesbach has been the deputy assistant administrator of the Office of Technology Transfer (OTT) at USDA since 2010. He leads the Partnership and Administration section. He performs on-site training of USDA scientists across the country, works with national patent committees to ensure that decisions adhere to USDA policy and to provide guidance on technology transfer, and advises technology transfer coordinators (TTCs) on Cooperative Research and Development Agreements (CRADAs) and other collaborative agreements.

Outside the office, for three and a half years, Griesbach was the mid-Atlantic regional coordinator for the FLC. In that role, he not only highlighted USDA's technology transfer, but also coordinated events to showcase all the laboratories in the region. He organized four annual meetings with record attendance, as well as nine technology forums and eight technology showcases. He also liaised with economic development entities, small businesses and other federal agencies.

During his tenure as regional coordinator, when federal agency personnel had limited travel funds, Griesbach accommodated all agencies by holding annual meetings in a location convenient to most and changed the traditional overnight meeting to a commuter meeting so more T2 professionals could attend. As part of the commuter meeting format, he also reduced registration fees so that not only the ORTA (Offices of Research and Technology Applications) managers could attend but also their staff personnel, thus increasing attendance and T2 training opportunities. Griesbach has forged many productive relationships with entities involved in the local innovation ecosystem that will serve the labs in the Mid-Atlantic Region for years to come.

Griesbach has served FLC in many other roles over the past nine years: laboratory representative, alternate agency representative, member at large, National Meeting instructor, and a frequent moderator and speaker at regional and national FLC meetings. He has won awards for state and local economic development, excellence in technology transfer and interagency partnership.

In Griesbach's view, there are seats at the innovation table for all opinions, expertise, experiences and entities. His expansive view of technology transfer has brought many different partners to the FLC and to the Mid-Atlantic Region in particular.

As an FLC Executive Board member, Griesbach championed the "LabTech in Your Life" project and served on the committee to conceive of the idea, define the scope the project and devise a plan of action. He also has been a proponent of FLC Business since its inception.

In Griesbach's view, there are seats at the innovation table for all opinions, expertise, experiences and entities. One can readily observe this in his interactions within the FLC and his follow-ups with every person he meets at the National Meeting. His expansive view of technology transfer has brought many different partners to the FLC and to the Mid-Atlantic Region in particular.

AWARDS

2019 REGIONAL AWARD WINNERS

FAR WEST

Outstanding Commercialization Success

Idaho National Laboratory
"Advanced Electrolyte Model (AEM)"

Lawrence Livermore National Laboratory
" IMPEDE® Embolization Plug"

Outstanding Partnership

Lawrence Livermore National Laboratory
"CyberSecure Integration of Networked DER (CINDER)"

Naval Facilities Engineering and Expeditionary Warfare Center
"Economic Development Collaboration – Ventura County"

Sandia National Laboratories
"Zero-V Hydrogen Fuel Cell Research Vessel"

Outstanding Technology Development

Idaho National Laboratory
"LoTempLene"

Lawrence Livermore National Laboratory
"Spack: A Package Manager for HPC Systems"

NASA Ames Research Center
"MiDAR: Multispectral Imaging, Detection, and Active Reflectance"

Naval Facilities Engineering and Expeditionary Warfare Center
"Low Profile Porous Swale Storm Water Best Management Practice (BMP)"

Naval Information Warfare Center Pacific
"Van Atta Array Retro-reflector"

USDA Agricultural Research Service Bioproducts Research Unit
"Reversible Antimicrobials: A Strategy to Reduce Ecotoxicity and Antibiotic Resistance"

USDA Forest Service Pacific Northwest Research Station
"Hot-Dry-Windy Index"

Technology Transfer Professional of the Year

Stephen Crutchfield
Naval Information Warfare Center Pacific

Laboratory Representative of the Year

Cheryl Monzon, ORTA
Naval Facilities Engineering and Expeditionary Warfare Center

MID-ATLANTIC

Excellence in Technology Transfer

US Army Combat Capabilities Development Command Chemical Biological Center
"Solid Decontamination Blend"

Educational Institution and Federal Laboratory Partnership Award

National Institutes of Health
Foundation for Advanced Education in the Sciences
"Advanced Studies in Technology Transfer Graduate School Certificate Program"

Outstanding Technology Transfer Professional Award

Dr. Robert J. Griesbach
U.S. Department of Agriculture
Agricultural Research Service

Laboratory Director of the Year Award

Dr. Eric L. Moore
US Army Combat Capabilities Development Command
Chemical Biological Center

MID-CONTINENT

Excellence in Technology Transfer

Sandia National Laboratories
"Small Reactor to Help Solve Worldwide Medical Isotope Shortage"

USDA Agricultural Research Service, Plains Area
"Sensor Based Automatic Variable Rate Irrigation Control for Greater Crop Water Productivity"

Notable State and Local Government Collaboration

Air Force Research Laboratory Directed Energy and Space Vehicles Directorates
"Technology Transfer Collaborative Initiatives"

Notable Technology Development Award

Los Alamos National Laboratory
"Atomic Armor"

Los Alamos National Laboratory
"Small Modular Nuclear Reactor – MicroReactor"

National Renewable Energy Laboratory
"PRECISE™: The World's Fastest, Smartest Solar Integration Solution From Interconnection to Integration"

Sandia National Laboratories
"Ultra-Low Wear Alloys"

Sandia National Laboratories
"Detergent-Assisted Fabrication of Multifunctional Nanomaterials"

Regional Partnership Award

59th Medical Wing, Science and Technology (59 MDW/ST)
"Clinical Research and Innovations for Air Force Medical Service (AFMS)"

National Renewable Energy Laboratory
"IN2 Innovation Incubator: Partnership between NREL and Wells Fargo Foundation"

MIDWEST

Excellence in Technology Transfer

Argonne National Laboratory
"Pressure Consolidation Refueling"

NORTHEAST

Excellence in Technology Transfer

MIT Lincoln Laboratory
"Microwave Imaging System Threat Exposure"

Princeton Plasma Physics Laboratory
"Radio Frequency Pasteurization of Shell Eggs"

SOUTHEAST

Excellence in Technology Transfer Project of the Year

Centers for Disease Control and Prevention
"Protecting Healthcare Workers by Detecting Contamination from Hazardous Antineoplastic Drugs"

USDA Agricultural Research Service Southeast Area
"Odor and Ammonia Capping of Swine Lagoons Using High-Performance Nitrifiers"

Excellence in Technology Transfer

Oak Ridge National Laboratory
"Licensing of ORNL Electrochemical Catalyst for Conversion of CO_2 to Ethanol"

Excellence in Technology Transfer Honorable Mention

NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML)
"A Novel Low-Cost, High-Precision Sea Temperature Sensor for Coral Reef Monitoring"

The FLC expresses its gratitude to the members of the Awards Committee for their tireless efforts in making the 2020 National Awards program a success.

Whitney Hastings
Food and Drug Administration
(Committee Chair)

Ariel Atkinson
USDA ARS Beltsville Area

Mojdeh Bahar
USDA ARS Beltsville Area

Sudeep Basu
Frost & Sullivan

Donna Bialozor
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Sharon Borland
U.S. Geological Survey

Robert Charles
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Chris Meyers
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Melissa Ortiz
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Gail Poulos
USDA ARS Beltsville Area

Johnette Schockley
U.S. Army ERDC – Cold Regions Research and Engineering Laboratory

Marc Suddleson
National Oceanic and Atmospheric Administration

Patricia Tomczyszyn
Minority Business Development Agency

Jeff Walenta
USDA ARS Plains Area

David Yang
National Cancer Institute

Xiao-Ying Yu
Pacific Northwest National Laboratory

It's time to start thinking about nominations for the 2021 FLC National Awards!

The calendar year for the national awards program runs from June, when the call for nominations is issued, to the following May, when the award winners are recognized at the National Meeting. Awards are presented in the following categories:

- Excellence in Technology Transfer Awards
- Interagency Partnership Award
- Laboratory Director of the Year
- Outstanding Technology Transfer Professional Award
- Rookie of the Year Award
- FLC Service Awards
  - Harold Metcalf Award
  - Representative of the Year Award
  - Outstanding Service Award
- State and Local Economic Development Award
- Impact Award
- Technology Transfer Innovation Award
- Technology Focus Award

The following timeline reflects the awards program activity as of press time. Please refer to the FLC website (www.federallabs.org) for updates.

June/July
Criteria for all awards are reviewed and revised.

August/September
Nomination period opens.

October
Nomination period ends.

November/December
Judging period for submitted award nominations in all categories.

January
Notification of award winners and non-winners in all categories.

February/March/April/May
Award winners register for FLC National Meeting; awards presented at FLC National Meeting.

LabTech in your life

The everyday places and spaces where you interact with federal technologies!

LabTech in Your Life is a virtual experience that showcases the commonly used, everyday technologies that were originally developed by a federal laboratory. This unique interactive space was designed to connect the public with innovative federal agency and laboratory research and development (R&D) that has achieved significant commercial market success.

Visit **federallabs.org/ltiyl** to check out the virtual environment of Lab Tech in Your Life.

Learn how technologies people use every day made their way to the marketplace and into homes! Users will discover nearly 50 federally developed commercialized technologies from 7 federal agencies, displayed throughout 7 different tour stops.

Go to: **federallabs.org/ltiyl** or scan your phone and take a trip around your home and learn more about Lab Tech in Your Life.

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