FLC

MIDWEST & SOUTHEAST REGIONAL MEETING

October 27-28, 2020

WELCOME TO THE **2020 FLC MIDWEST & SOUTHEAST JOINT REGIONAL MEETING**

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TIPS FOR FIRST TIME VIRTUAL ATTENDEES

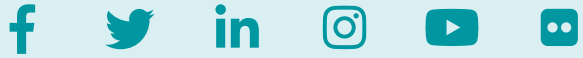
Mark your calendar and log in at the appropriate times with the login information provided by Jujama. Attend the Meeting Orientation at 10:30 am EDT on Tuesday or Wednesday for tips about navigating the meeting platform. Recordings of all presentations will be available after the meeting, but you can ask questions in real time online during the scheduled sessions.

Don't miss the Networking sessions at 4 pm EDT on Tuesday and at 3:15 pm EDT on Wednesday to connect with your Regional Coordinators and your colleagues.

T2 GETS SOCIAL

We'll be posting live on FLC's social media channels during the Midwest & Southeast Regional Meeting, sharing details from sessions and panels. Follow @federallabs on Instagram, Facebook and Twitter (just federallabs on LinkedIn) and join in by adding #FLCMWSE20 and #FLCawards on your posts.

@federallabs #FLCMWSE20



SCHEDULE AT A GLANCE

TUESDAY, OCTOBER 27 ALL TIMES EDT

TIME	ACTIVITY	INFO
10:30 – 10:50 am	**Meeting Orientation**	Learn the intricacies of navigating the virtual meeting venue with FLC staff Nerissa Legge and Corin Hindenach.
10:50 – 11 am	**Break**	Grab some coffee, take a break, and join us back at the top of the hour.
11 – 11:10 am	**Welcome to Day 1**	The Regional Coordinators welcome attendees to the virtual Midwest & Southeast Regional Meeting on behalf of the FLC.
11:10 – 11:40 am	**FLC National Update**	FLC Chair John Dement will provide an update on the current status of FLC initiatives, including new bylaw changes, an update on the partnership with AUTM, areas for FLC growth, and new programming opportunities.
11:40 am – Noon	**Keynote – Midwest Award Winner**	Johnnie Shockley will highlight the technology transfer story underlying the 2020 Midwest Interagency Partnership Award for the BUILDER facilities management software technology.
Noon – 12:15 pm	**Break**	Set your lunch table and get ready for trivia!
12:15 – 12:45 pm	**Lunchtime Trivia with Regional Coordinators**	Join Sabra Tomb from the Midwest, and Paige George from the Southeast, as they test your FLC and federal lab knowledge in this fun lunchtime session. Compete against your colleagues to win a Starbucks gift card!
12:45 – 1 pm	**Break**	Now that you've filled up on trivia, it's time to get ready for the next session.
1 – 1:45 pm	**Legislative Changes**	Courtney Silverthorn will discuss potential changes to technology transfer legislation and other pertinent legislative updates.
1:45 – 2 pm	**Break**	Grab some coffee, take a break, and join us back at the top of the hour.
2 – 2:45 pm	**Shaping Tech Transfer in Your Lab through FLC Involvement**	Learn from FLC member panelists who have used the resources available from the FLC to support technology transfer in their labs. The session will include Q&A.
2:45 – 3 pm	**Break**	More coffee? At this point you might want to switch to decaf. But do take a break before the next session.
3 – 3:45 pm	**Engaging Your Regional Innovation Networks**	Hear from partnership intermediaries and their companion laboratories about how engaging in innovation ecosystems can enhance your lab's mission and provide critical support to local organizations.
3:45 – 4 pm	**Break**	You know the drill by now. Take one last break and get ready to network!
4 – 4:30 p.m.	**Networking**	**Room 1:** Jenna Dix and Paige George will lead the networking session for those new to the FLC and technology transfer (T2). **Room 2:** Sabra Tomb and Ben Henry will lead this networking session for those that are experienced with the FLC and T2.

WEDNESDAY, OCTOBER 28 ALL TIMES EDT

TIME	ACTIVITY	INFO
10:30 – 10:50 am	**Orientation**	Learn the intricacies of navigating the virtual meeting venue with FLC staff Nerissa Legge and Corin Hindenach.
10:50 – 11 am	**Break**	Grab some coffee, take a break, and join us back at the top of the hour.
11 – 11:10 am	**Welcome to Day 2**	The Regional Coordinators welcome attendees to Day 2 of the virtual Midwest & Southeast Regional Meeting on behalf of the FLC.
11:10 – 11:40 am	**What the FLC Can Do for You / How to Draft an FLC Awards Submission Package**	Members of the FLC staff will discuss the future of the FLC. The topics that will be covered include updates to the FLC website and FLC Business, the charters for the Promote, Educate, and Facilitate Pillars; and how to draft and submit a successful awards package.
11:40 – Noon	**Keynote – Southeast Award Winner**	Gail Poulos will showcase the technology transfer story underlying the 2020 Southeast Excellence in Technology Transfer Award for recovery of ammonia from waste using gas-permeable membranes.
Noon – 12:15 pm	**Break**	Grab some grub and get ready for the Awards Recognition Luncheon.
12:15 – 12:45 pm	**Awards Recognition Luncheon**	Representatives from each of the four award-winning teams will give a brief overview of their technologies and their tech transfer stories.
12:45 – 1 pm	**Break**	Spend some time networking and get to know the other members of your region.
1 – 1:45 pm	**How to do a Technology Assessment**	You have received a new invention disclosure. Your agency has an ownership interest and you are the lead party. What do you do next? This session will provide two different perspectives on how you can conduct a quick technology assessment.
1:45 - 2 pm	**Break**	Grab some coffee, take a break, and join us back at the top of the hour.
2 – 2:45 pm	**Legal Hot Topics**	Air Force patent attorney Chuck Figer will discuss emerging legal trends and the subsequent impact of these trends on the technology transfer community.
2:45 – 3 pm	**Closing Remarks**	The Regional Coordinators recap the meeting and send you off for another year of great T2 engagement.
3 – 3:15 pm	**Break**	Mini-break to grab a beverage before happy hour networking!
3:15 – 3:45 pm	**Networking**	Special guest Abby Boggs closes the meeting with a discussion focused on successful T2 agreement execution and how to hone your T2 skills.

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Collaborations and T2 drive use of USACE facilities management software at NNSA and beyond

Enabling cost savings, objective assessments, and improved planning, the BUILDER™ Sustainment Management System is an asset-management gamechanger for government, municipalities, and industry.

Created by the Construction Engineering Research Laboratory (CERL) within the U.S. Army Corps of Engineers' (USACE) Engineering Research and Development Center (ERDC), BUILDER is a web-based asset management software tool that helps civil engineers, technicians, and facilities managers decide when, where, and how to best maintain building infrastructure.

Strongly collaborative relationships among numerous federal agencies have helped these individuals take advantage of BUILDER. What began as an essential tool for the military to assess facility needs while keeping assessment costs down and maintaining military readiness is now making facility management more efficient for multiple non-military agencies, municipalities, and even the commercial sector, to the point that many organizations now often require BUILDER to be included in any proposal they will consider.

Because building assets are so vast and diverse, a "knowledge-based" philosophy drives the BUILDER process. Using real property data and life-cycle attributes, BUILDER provides a comprehensive picture of the overall performance of building assets and their key components. Instead of being forced to react to unexpected component breakdowns and system failures at the most inopportune times, building managers can now develop short- and long-range work plans based on sound investment strategies, prioritization criteria, and budget constraints.

In supporting the use of BUILDER throughout the federal government, the CERL has been developing strategic partnerships, which are in various stages of adoption, with numerous agencies: Defense Health Agency, National Nuclear Security Administration (NNSA), National Oceanic and Atmospheric Administration, National Institute of Standards and Technology, Department of Veterans Affairs, Coast Guard, Agricultural Research Services, and Office of the Director of National Intelligence. CERL's collaborations with industry have included patent license agreements (PLAs) with AECOM, Atkins Global, Calibre Systems, Cardno, DIGON Systems, FM Projects, GoldenWolf, North Pacific Support Services, and Tetra Tech.

Above: BUILDER Summits are an essential technology transfer tool in engaging numerous federal agencies, as well as other partners.

In addition to familiar tech transfer mechanisms such as cooperative research and development agreements, patent license agreements, and interagency partnerships, the CERL team's collaborative approach has included informal alliances with groups such as the National Academy of Sciences and hosting "user summits" to showcase BUILDER's capabilities.

One example of impact is CERL's collaboration with the NNSA, where an unprecedented 60,000 asset records were moved in approximately three months. Implemented in 2016, BUILDER software is now used for management of all NNSA assets.

"Traditionally, infrastructure management was done by looking in the rearview mirror," said Tyson Deschamp, Deputy Director, Office of Infrastructure Planning & Analysis at NNSA. "With our new strategy, we are turning that around to look out the front windshield. We see obstacles coming our way and proactively adjust to meet and overcome them."

In 2019, the Office of Management and Budget (OMB) cited BUILDER as an important tool for implementing the capital-planning requirements that OMB sees as vital to future federal budgeting. BUILDER is already being employed to assess the ongoing condition of over one billion square feet of federal real-property space, and with the imprimatur of the OMB, the CERL is poised to continue developing strong, lasting interagency partnerships at a remarkable pace.

USDA Agricultural Research Service

USDA-led team's findings could help explain how agriculture can affect antibiotic resistance

USDA-Agricultural Research Service scientists led an international team of academic, government and industry partners to create a technology that could be used to help explain why some people don't respond to antibiotics or other drug treatments.

This discovery also has agricultural implications; for example, it can help address the question of whether antibiotic administration to cattle affects the frequency of antibiotic-resistant microbes that could pass into food supply systems.

The exchange of antimicrobial resistance (AMR) genes among bacteria is thought to be a key process leading to multidrug resistance (MDR) in humans, which reduces the effectiveness of antibiotics and other drugs for fighting disease-causing microorganisms. But this concept has been difficult to study. Scientists could identify the presence of MDR genes using genetic sequencing, but they couldn't tell which specific bacterial species were capable of hosting those genes. The ARS-led team found a way to link AMR genes to their potential hosts in a high-throughput manner.

This technology and related published findings will benefit research to reduce multidrug resistance in animal products and in the environment, as well as studies examining methods to reduce infections in hospital environments, where multiple bacterial species may transfer AMR genes among each other.

As mentioned, this discovery also has food safety implications, as traditional screening methods might not detect AMR genes being transferred between microbes in animals or plants. By identifying all potential hosts for AMR transfer, scientists can assess whether a microbiome has potential reservoirs for AMR genes that could cause other disease-causing pathogens to become resistant over time. In addition, this technology will potentially provide a new platform for federal regulatory agencies to develop new food safety guidelines.

The technology transfer story began with a partnership that included the ARS, the National Institutes of Health-National Human Genome Research Institute (NGHRI), the Roslin Institute in Scotland, and two industry partners, Pacific Biosciences Inc. and Phase Genomics Inc.

ARS scientists prepared samples from the rumen microbiome of a single Holstein cow to serve as a suitable target for these new techniques. Pacific Biosciences helped sequence this sample, and NIH scientists applied state-of-the-art computational algorithms to create maps of each microbial genome. Phase Genomics scientists also generated data that identified biological links between different DNA molecules that showed these molecules existed within the same cells at one particular moment in time.

Above: A University of Wisconsin student collects a rumen sample from a cannulated Holstein cow from the US Dairy Forage Research Center's Prairie du Sac research herd. The facility hosts 20 cannulated dairy cows and is a recognized leader in the study of the microbial communities present in the cattle rumen.

Collecting and organizing all of these data, ARS and Roslin Institute scientists identified unique biological features in the dataset such as genes and virus genomes. A method was then developed to link viruses, or other mobile DNA that could transfer between cells, with potential host bacterial cells. The findings were published in August 2019 by Genome Biology.

The microbiology and medical research communities were the recipients of the transferred technology and received notice of this new method via journal publications and seminar presentations. In the future, this technique is likely to be applied to metagenome community surveys conducted in the fields of food safety and human medicine.

This new method has already been applied by others following the publication of the Genome Biology study, which at the time of award submission in July 2020 had been accessed 5,459 times and cited in seven studies.

OAK RIDGE National Laboratory

ORNL and licensee MVP join forces to make thermoset materials an option for large-scale 3D printing

Oak Ridge National Laboratory (ORNL) and Knoxville, Tennessee-based Magnum Venus Products, Inc. (MVP) have successfully created and deployed the world's first large-scale thermoset additive manufacturing machine.

The Reactive Additive Manufacturing (RAM) machine is the first product of its type and capabilities commercially available to industry for 3D printing of thermoset materials. RAM allows for a wide range of applications including low-cost fixtures, tools, and autoclave molds for a variety of industries such as marine, tub and shower, automotive, and aerospace.

Thermoset materials have a number of advantages over thermoplastics in additive manufacturing. Layering times with thermoset materials are shorter, printing requires less energy, and the cross-linking of polymers between printed layers results in stronger products that are more tolerant of high temperatures.

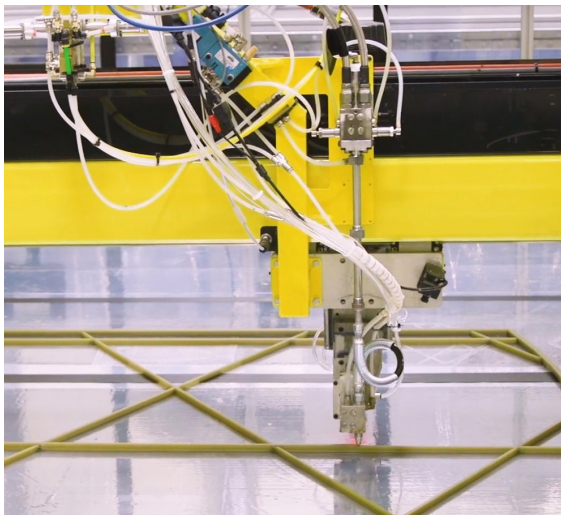
With a current print area of 16' x 8' x 3.5', the RAM machine has the ability to produce large-scale parts, in various resolutions, using thermoset materials. The patent-pending removable table decreases print-cycle time and streamlines post processing.

"Thanks to this innovation, research and development managers will be able to prototype faster and bring products to market faster," said Bob Vanderhoff, CEO of MVP. "Procurement departments will also enjoy shortened lead time on crucial molds—allowing for rapid deployment. This was made possible through ORNL software that allows the integration of multivariate print process parameters."

At ORNL, partnerships with industry—the additive manufacturing industry in particular—are a key success factor.

"Our researchers are delivering innovative breakthroughs in additive manufacturing to improve material properties and process technologies," said Moe Khaleel, associate lab director for Energy and Environmental Sciences at ORNL. "We value working closely with our industrial partners like MVP to ensure we're accelerating the path for commercialization to increase American competitiveness."

MVP is a leading manufacturer of composite application equipment for manufacturers in industries including automotive, aerospace, transportation, marine, railway, and oil and gas, and wind energy. Along with systems designed for composite application, MVP also has equipment that supports the foam and polyurethane industries including polyurea, adhesives, and epoxies.



Above: Printer head for MVP's Reactive Additive Manufacturing machine

MVP has worked with ORNL under two cooperative research and development agreements (CRADAs). The funding for the first CRADA exceeded $500,000 over 24 months, and led to the demonstration of additive manufacturing of thermoset cellular structures. Funding for the second CRADA was $8.2 million over 36 months, focused on continued development of large-scale reactive polymer additive manufacturing platform and techniques to enable rapid 3D-printing of large objects.

In the second CRADA, MVP agreed to allocate $4.1 million for in-kind contributions over three years, offering continued product research and development with ORNL. In addition, MVP has allocated equipment, technical expertise and assembling personnel to assist in the development.

ORNL licensed two technologies to MVP. The first was a non-exclusive license for the Reactive Polymer Fused Deposition Manufacturing technology solely developed by ORNL, which features patented methods and compositions for additive manufacturing that include reactive or thermosetting polymers, such as urethanes and epoxies.

The second agreement was an exclusive license for a segmented build platform co-developed by MVP and ORNL. MVP plans to exhibit the codeveloped system at tradeshows worldwide, produce marketing content and contributions to demonstration case studies.

USDA Agricultural Research Service

USDA and Renewable Nutrients partner
to improve nitrogen recovery from livestock waste

Researchers from the US Department of Agriculture (USDA) Agricultural Research Service Southeast Area (ARS SEA) have developed a new way to recover nitrogen from livestock wastes, which has been commercialized by Pinehurst, North Carolina-based Renewable Nutrients. The estimated potential value of implementing this nutrient recovery system in dairy farms alone is about $1.3 billion.

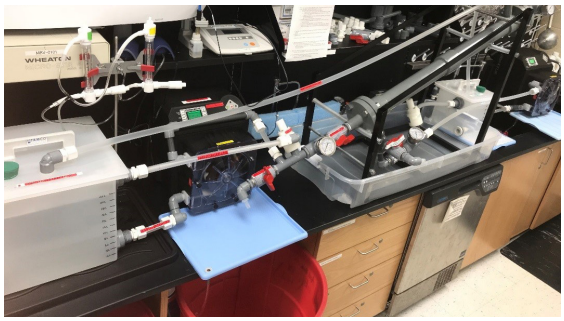
Conservation and recovery of nitrogen from livestock, industrial and municipal wastes is important for economic and environmental reasons. In the United States, the largest source of ammonia emissions—and the distinctive odor they generate—is livestock farming. The nitrogen components of ammonia are useful as a fertilizer, but many areas in the U.S. produce more manure-generated nutrients than the available cropland can assimilate. Therefore, the removal and recovery of ammonia is a desirable feature for new treatment technology for livestock waste because the nutrients can be exported off the farm. This could solve the problems of nitrogen surpluses in concentrated livestock production, provide a substitute for commercial fertilizers, and create new businesses.

The new technology recovers ammonia-nitrogen from wastes using gas-permeable membranes. The process involves passing ammonia through micro-porous hydrophobic membranes and concentrating it in a clear solution. The process can be used for removing and recovering nitrogen from two types of livestock waste: liquid manures in storage tanks and the air of poultry and animal barns. It can recover 98% of the nitrogen.

Renewable Nutrients, a small business with experience recovering phosphorus from wastes, was the recipient of the ammonia trapping technology through two exclusive licenses granted by USDA. Cooperation of the federal laboratory with licensee through a CRADA helped test a company-developed pilot unit to determine its suitability for municipal wastes and helped the company select the best membrane material composition for development of their commercial units. The technology is commercialized under the name "QUICK WASH Nitrogen Removal & Ammonia Recovery."

Other technology transfer mechanisms and activities included:

- Five U.S. patents covering the ammonia capture technology using gas-permeable membranes developed by ARS for both liquid and air applications.



Above: *A prototype N recovery module developed by Renewable Nutrients was tested at USDA -ARS laboratory in Florence, South Carolina, using a CRADA to evaluate performance in municipal wastewater from the city of Chapel Hill, North Carolina.*

- Three on-farm demonstrations by ARS scientists for universities and research centers. At the University of Maryland Eastern Shore, in chicken houses fitted with the ammonia recovery system, the ammonia decreased 46% in the air and 45% in the litter compared with standard processes, and bird mortality was reduced 47%.
- A pilot ICorps@ARS program for customer discovery and feedback of research needs by livestock industry that broadened the impact of the research.
- Webinars and training on the new technology presented by scientists to the USDA Natural Resources Conservation Service and the Environmental Protection Agency.
- Outreach resulting in 12 high-impact scientific publications, more than 20 conference presentations, and numerous popular press articles describing the technology.

The technology transfer advanced the laboratory's mission "to conduct research and transfer solutions that improve agricultural production, protect the environment, and enhance conservation of natural resources - all within an efficient and profitable agriculture". Implementing the new technology in municipal plants could have global positive impacts, increasing nitrogen recycling and reducing greenhouse gas emissions.

For Renewable Nutrients, adding an ammonia recovery component to its portfolio made the company more competitive for total nutrient recovery (nitrogen and phosphorus) from the side-stream effluent of municipal plants that contains high concentrations of both phosphorus and nitrogen.

SIX FLC REGIONS

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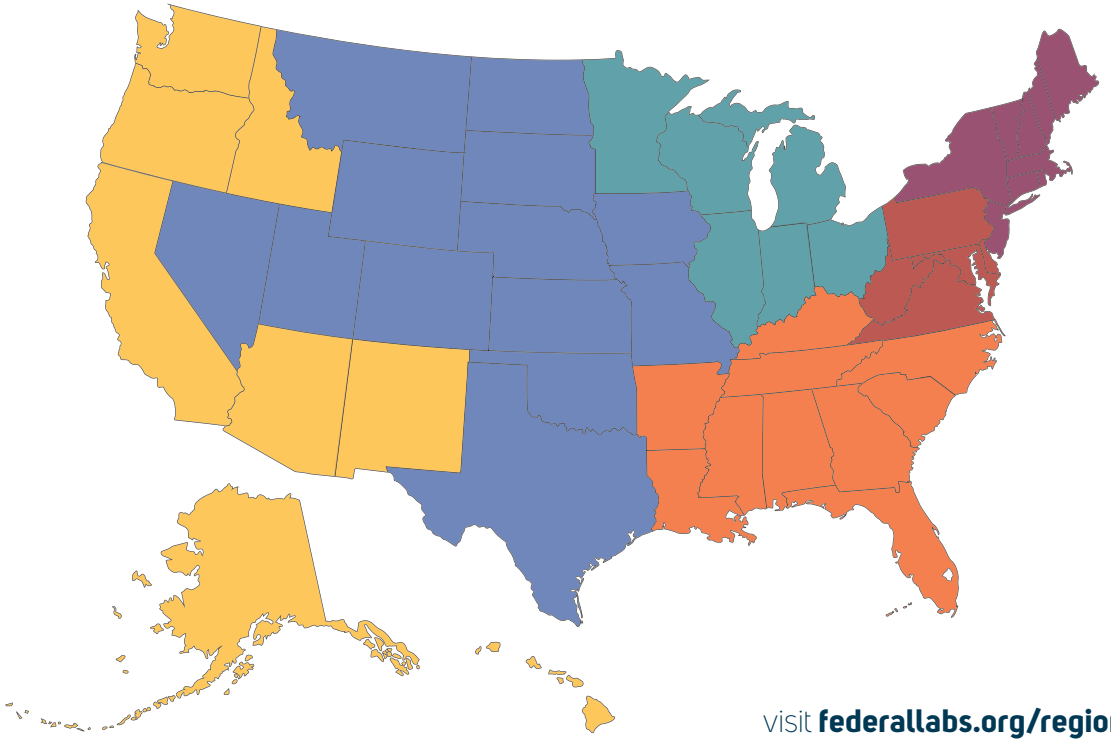

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