



The 2022 Annual Report

The James B. Beam Institute at the University of Kentucky is a leader for Kentucky's spirits industry, creating exceptional teaching and outreach programs, along with multidisciplinary research to ensure sustained competitiveness from farm to product.

JAMES B. BEAM
INSTITUTE K-Y U-S

 University of Kentucky

**James B. Beam Institute
for Kentucky Spirits**

Ensuring the welfare and prosperity of Kentucky's spirits industry by promoting economic sustainability, environmental stewardship and responsible consumption.



Table of Contents

Director's Welcome

Beam Suntory University Relations Welcome

Beam Institute Leadership

Institute News

Beam Suntory President Albert Baladi Visits the University of Kentucky
Work on Social Responsibility Continues
Scotch Whisky Research Institute Visits Kentucky – Plans for Future Cooperation Mature
Beam Institute Partners with Equine Industries for “Kentucky Signature Industries” Career Fair

Industry Training and Cooperation

Apprenticeship Program Enters Its Second Cohort
Several Safety Training Days Offered by Central Appalachian Regional ERC
One Day Whiskey Webinar
Bardstown Bourbon Chill Haze Meeting

Distillation, Wine and Brewing Certificate

50+ Students Complete the Distillation, Wine and Brewing Certificate in the 21-22 Academic Year
Scholarships
On the Rocks Class Reaches Maximum Enrollment
Study program in St. Croix/U.S. Virgin Islands Planned for the Summer of 2023
UK Student Interns are Part of Buffalo Trace's Archive Work
Bourbon Oral History Project Continues in 2023 as Graduate and Undergraduate Class

Alumni News

Distillation Certificate Graduate and UK Chemical Engineering Alumnus
Named Head Distiller at James E. Pepper
Distillation Certificate graduate to join the Operations Leadership Program at Sazerac

Research Update

Grain Innovation to Benefit Farmers and Distillers
Water, Sustainability, and Fermentation
Liquid flows during Maturation
The Next Generation of Product Blending
Future Research

Building Update

Annual Conference Update

The James B. Beam Institute for Kentucky Spirits has three fundamental goals that drive our efforts:

1. Providing unparalleled support to the next generation of distillers,
2. Partnering with the distilled spirits industry to tackle innovation and research questions
3. Providing transdisciplinary leadership to a global industry with a Kentucky heart.

Our next generation of distillers walk into a complex world where they need to consider supply security, economic prosperity and sustainability. Navigating these complexities will require knowledge bridges for teamwork and data sharing across our industry. The annual industry conference remains our flagship outreach vehicle to bridge these gaps in communication and discuss emerging problems.

To further create bridges, along with the Kentucky Distillers Association, we hosted the Scotch Whisky Research Institute in Kentucky to define cross-Atlantic opportunities. Additionally, the team traveled to the Caribbean's U.S. Virgin Islands to learn from our partners in rum production and we will begin teaching classes there in Summer 2023.

Modern businesses work in problem-focused, transdisciplinary and diverse teams. We need to train our students to be ready and we are meeting that challenge. A recent article in The Spirits Business by Nicola Carruthers stated "innovation, renovation and premiumization," drive consumers' and producers' interest to delve into what is possible in the American Whiskey category. Reflecting on this statement, it is compelling that the James B. Beam Institute has grown the list of faculty fellows to 60 members in the past year and research across these fellows' departments has tripled. Experts are eager to share their knowledge, build bridges between problems and solutions and to serve the industry.

Some particularly inspiring bridges being built are between distilled spirits and

agricultural/engineering value chains. Examples from this past year include:

- Woodford Reserve hosted the Small Grains Gathering to build small grains value chains and mills in Kentucky
- Maker's Mark Star Hill Farm hosted the White oak genetics and tree improvement program
- Bardstown Bourbon Company hosted the Chill Haze Workshop.

Our work in building bridges is not done. Kentucky Gov. Andy Beshear's office reported more than \$2 Billion in new capital investments into Kentucky Bourbon in 2022, requiring approximately 700 additional personnel. Despite these impressive numbers, they represent a fraction of bourbon's 1970's peak production, adjusted for population and market growth.

Our commitment to Kentucky's flagship signature bourbon industry has always been that of humble service. The James B. Beam Institute for Kentucky Spirits has a responsibility and vision to support these core tenants. With your help, 2023 will further strengthen the lives of our students, our industry and our state.



Dr. Seth DeBolt

Director, James B. Beam Institute for Kentucky Spirits

Professor, College of Agriculture, Food and the Environment

It's hard to believe that it's been four years since Beam Suntory partnered with the University of Kentucky to establish the James B. Beam Institute for Kentucky Spirits.

The Beam Institute was established to engage in multidisciplinary research, education, and workforce development to elevate the Kentucky spirits industry. Integral to the mission of our partnership is the construction of a 7,500 square foot operational distillery, equipped with analytic and teaching space, on the University of Kentucky's campus. Construction of the distillery is set to be completed this year and will serve as a catalyst for industry collaborations focused on sustained growth.

Having access to a state-of-the-art teaching and research distillery will allow for experimental research, hands on training, and a space for us to think about what is next for Kentucky spirits. Beam Suntory has laid the foundation for the Beam Institute and is excited about what is next as we work with our peers to elevate the industry.

One such partnership is the Beam Institute Advisory Board, which met in January to review our accomplishments, including the annual conference, Memorandum of Understanding with the Scotch Whiskey Institute, industry internship programs, increased certification enrollment, and student training and recruitment opportunities. As the discussion shifted to what was possible for our future, the Advisory Board emphasized the importance of having access to a fully operational distillery. This will play a key role in engaging students in the full breadth and depth of the industry and will also serve as a funding mechanism for the Beam Institute. As demonstrated, the Beam Institute is uniquely positioned to align partnerships and lead collaborations to create innovative solutions, propelling the industry into the future.

Growing for Good and Giving Back to Society are core values of ours at Beam Suntory, and everything we do is through the lens of our Proof Positive sustainability strategy. Our donation to the University of

Kentucky to establish the Beam Institute is not only an investment in the future of Bourbon, but also one of the ways that we are contributing to a more sustainable future. In partnership with the Beam Institute, we continue to support research to address industry needs, including efforts to ensure the American White Oak will be around for generations, to reduce liquid loss through warehouse airflow and barrel construction and to improve liquid quality through process improvement.

Through our partnership, we are also supporting the development of both current and future beverage industry professionals. This year marked our second cohort of our Whiskey Apprenticeship program, designed to combine theory and hands-on training for our distilling workforce.

At Beam Suntory, our people and our brands have embraced Proof Positive and continue to contribute to our progress and impact. Last year, we launched our company's inaugural sustainability report, outlining our goals and progress against our Proof Positive strategy. We also announced a major investment in our Jim Beam production facility in Boston, KY, which will cut carbon emissions from that facility by 50 percent. Last year, Maker's Mark achieved B Corp Certification - the largest distillery in the world to do so and the first in Kentucky's famed Bourbon Country to achieve the distinction - which recognizes companies working to build a more inclusive and sustainable economy.

We are committed to contributing to a more sustainable future and are excited about the role the Beam Institute will play in bringing industry peers together to develop the next generation of American Whiskey.



Lisa Banner

University Relations and Institute Program Director, Beam Suntory

A photograph of three men in an industrial setting, likely a distillery. One man in a dark blue polo shirt and khaki pants is pointing towards a metal grate. Another man in a light blue shirt is looking in the same direction. A third man in a dark blue polo shirt and a baseball cap stands in the background. The floor is made of metal grates with yellow safety lines.

Beam Institute Leadership

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.

The team casting strategic vision for the Institute and serving as expert resources for solving multi-faceted industry issues

- Steering Committee Members
- Faculty Fellows from the College of Agriculture, Food and Environment
- Faculty Fellows from the College of Engineering
- Faculty Fellows from the College of Design
- Faculty Fellows from the College of Medicine
- Faculty Fellows from the James W. Martin School of Public Policy and Administration
- Faculty Fellows from the College of Health Sciences
- Faculty Fellows from the College of Communication and Information
- Faculty Fellows from the College of Economics
- Faculty Fellows from the College of Arts and Sciences
- External Faculty Fellows



College of Agriculture, Food and Environment Fellow and Forestry and Natural Resources Professor Jeff Stringer speaks at the Institute industry conference in the Gatton Student Center.

Steering Committee Members

In July of 2022, the Beam Institute for Kentucky Spirits conducted an advisory board meeting that extended to Kentucky Bourbon industry leaders. Discussions included the strategic vision for the institute's future and utilization of the building and its facilities.

In January 2023, the group reconvened to tour the construction site of the James B. Beam Institute for Kentucky Spirits and to budget and plan the operational funding for the future.

We are thankful to the following industry representatives:

- Lisa Banner, Beam Suntory
- Mark Erwin, Bardstown Bourbon Company
- Jason Gambrell, Castle & Key
- Eric Gregory, Kentucky Distillers’ Association
- Larry Krift, Campari/Wild Turkey
- Blake Layfield, Beam Suntory
- Norm Matella, Campari/Wild Turkey
- Kevin Smith, Beam Suntory
- Andrew Wiehebrink, Independent Stave Co.
- Justin Willet, Bardstown Bourbon Company

And to the University of Kentucky partners:

- Rudy Buchheit, UK College of Engineering

- Nancy Cox, UK College of Agriculture, Food and Environment
- Danielle Jostes, UK College of Agriculture, Food and Environment
- Jana Kennelly, UK College of Engineering
- Jessica Koenigsknecht-Talboo, UK Philanthropy
- Mark Meier, UK College of Arts and Sciences
- Simon Sheather, UK Gatton College of Business and Economics

Faculty Fellows

The group of fellows affiliated with the Beam Institute has grown to 60 scholars. The list includes the first ‘non-academic’ fellow, Noah Rothbaum, as well as four faculty members from outside the University of Kentucky. This group of experts serves as a resource for the institute and for the industry. Members are ready to use their expertise to solve real industry issues.

Brad Berron, Beam Institute research director, can help make the connections.

College of Agriculture, Food and Environment

- Akinbode A. Adediji, Associate Professor, Biosystems and Agricultural Engineering
- Tyler Barzee, Assistant Professor, Biosystems and Agricultural Engineering
- Donald Colliver, Professor, Biosystems and Agricultural Engineering
- Mark Coyne, Professor of Soil Microbiology, Plant and Soil Sciences
- Czarena Crofcheck, Professor, Biosystems and Agricultural Engineering
- Seth DeBolt, Director, James B Beam Institute for Kentucky Spirits
- Allan Bruce Downie, Professor, Horticulture
- Jarrad Gollihue, Post-Doctoral Scholar, Biosystems and Agricultural Engineering
- John H. Grove, Professor, Plant and Soil Sciences
- David Hildebrand, Professor, Plant & Soil Sciences
- Vanessa P. Jackson, Department of Retailing & Tourism Management
- Tomo Kawashima, Assistant Professor, Plant and Soil Sciences
- Chad D. Lee, Director, Grain and Forage Center of Excellence, Plant and Soil Sciences
- John M. Lhotka, Associate Professor of Silviculture, Forestry and Natural Resources
- Luke Moe, Associate Professor, Plant and Soil Sciences

- Melissa Morgan, Associate Professor, Department of Animal and Food Sciences; Director, Food Systems Innovation Center
- Jacob Muller, Forestry and Natural Resources
- Sue E Nokes, Associate Dean for Faculty Affairs and Facilities (UK College of Engineering) and Professor, Biosystems and Agricultural Engineering
- Thomas Ochuodho, Forestry and Natural Resources
- Robert R. (Bob) Perry, Agriculture Project Manager/Chef in Residence, Dietetics and Human Nutrition
- Sharyn Perry, Professor, Plant and Soil Sciences
- Michael Sama, Associate Professor, Biosystems and Agricultural Engineering/Electrical & Computer Engineering
- Jeffrey W. Stringer, Professor and Chair, Forestry and Natural Resources
- Surendranath Suman, Professor, Animal and Food Sciences
- Lisa Vaillancourt, Professor, Plant Pathology
- Shuoli Zhao, Assistant Professor, Agricultural Economics

College of Engineering

- John Balk, Associate Dean for Research and Graduate Studies, Professor of Materials Science
- Brad Berron, Associate Professor of Chemical Engineering, Department of Chemical and Materials Engineering
- Rudolph Buchheit, Dr. Rebecca Burchett Liebert Dean of Engineering, Department of Chemical and Materials Engineering
- Regina Hannemann, Senior Lecturer, Electrical and Computer Engineering
- Anastasia Hauser, Lecturer, Chemical and Materials Engineering
- Jiangbiao He, Assistant Professor, Principal Investigator, Lab Director, Electrical and Computer Engineering
- J. Tom Henninger, Senior Lecturer, Mechanical Engineering
- Alexandre Martin, Professor, Mechanical Engineering
- Lindell Ormsbee, Director, Kentucky Water Resources Research Institute, Kentucky Water Resources Research Institute
- Savio Poovathingal, Assistant Professor, Mechanical Engineering
- Stephen Rankin, Professor, Chemical and Materials Engineering
- Steven Schafrik, Associate Professor, Mining Engineering
- Brent Seales, Professor, Computer Science
- Sarah Wilson, Assistant Professor, Chemical and Materials Engineering

College of Design

- SK O’Brien, Assistant Professor, Department of Product Design

College of Medicine

- Luke H. Bradley, Chellgren Endowed Professor & Acting Chair, Department of Neuroscience
- Michele Staton, Professor, Department of Behavioral Science

James W. Martin School of Public Policy and Administration

- Rajeev Darolia, Associate Professor, Public Policy and Economics

College of Health Sciences

- David “Travis” Thomas - Associate Professor, Athletic Training and Clinical Nutrition

College of Communication and Information

- Brian Real, Assistant Professor, School of Information Science

Gatton College of Business and Economics

- Brad Patrick, Executive in Residence, Management
- Simon Sheather, Dean and Truist Endowed Chair in Data Analytics, Gatton College of Business and Economics

College of Arts and Sciences

- Anastasia Curwood, Associate Professor of History and Director of the Commonwealth Institute for Black Studies and African American and Africana Studies, History
- Janice Fernheimer, Zantker Professor and Director of Jewish Studies; Professor of Writing, Rhetoric, and Digital Studies, Writing, Rhetoric, and Digital Studies; Jewish Studies
- Alan Fryar, Professor, Earth and Environmental Sciences
- Michael Matthew McGlue, Pioneer Natural Resources Endowed Professor , Earth and Environmental Sciences
- Arnold Stromberg, Professor, Statistics
- Edward W. Woolery, Professor and Chair, Department of Earth and Environmental Sciences
- Junfeng Zhu, Geologist V, Kentucky Geological Survey

External Faculty Fellows

- Noah Rothbaum, Fellow, Flaviar
- Harmonie Bettenhausen, Director of the Hartwick College Center for Craft Food & Beverage
- Michael Crowder, Associate Provost and Dean of the Graduate School; Interim Vice-President of Research and Innovation; Professor of Chemistry and Biochemistry, Miami University, Oxford, Ohio
- Kurt A. Rosentrater, Associate Professor, Agricultural and Biosystems Engineering/Executive Director, Distillers Grains Technology Council, Iowa State University
- Stuart Williams, Associate Professor, Department of Mechanical Engineering, University of Louisville

News relating to the Institute's contributions to research, education, and industry

- Beam Suntory President Albert Baladi Visits the University of Kentucky
- Work on Social Responsibility Continues
- Scotch Whisky Research Institute Visits Kentucky – Plans for Future Cooperation Mature
- Beam Institute Partners with Equine Industries for “Kentucky Signature Industries” Career Fair

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.



Beam Suntory president Albert Baladi visited the University of Kentucky in 2022.

For the first time, the UK College of Agriculture, Food and Environment hosted a reimagined career fair featuring two of the state's most iconic industries: equine and bourbon.



400+

participants took advantage of the opportunity



150+

recruiters representing 60+ employers attended



15

different regional colleges and universities participated

Beam Suntory President Albert Baladi Visits the University of Kentucky

In 2022, Beam Suntory president Albert Baladi visited the University of Kentucky for meetings with UK president Eli Capilouto, Beam Institute representatives and students. He also visited UK's Learning Bar, where UK students learn to better understand the adverse effects of excess alcohol consumption. The Learning Bar gives participants tools to recognize and intervene in cases of excessive drinking. Baladi also visited the Beam Institute construction site on the south side of Lexington campus and expressed his continued support for the institute and the work at the University of Kentucky.

Work on Social Responsibility Continues

The Beam Institute closely cooperates with UK's Learning Bar, a hands-on, interactive, alcohol education experience for students across the UK community. Participants are trained in alcohol's impact on the body and community, as well as strategies to mitigate the harms from alcohol. Lessons cover topics ranging from standard drink sizes and blood alcohol level (BAL) to alcohol poisoning and bystander intervention.

Students leave the Learning Bar experience having gained knowledge, skills, and resources to be stewards of responsible consumption.

The Learning Bar sees about 1,300 students per year through drop-ins, referrals and freshman classes. In 2022, the Learning Bar also welcomed non-student visitors, such as Beam Suntory President Albert Baladi, and the Kentucky Distillers' Association's Leadership Academy participants.

Scotch Whisky Research Institute Visits Kentucky – Plans for Future Cooperation Mature

In late 2022, the Kentucky Distillers' Association and the Beam Institute co-hosted two representatives from the Scotch Whisky Research Institute to lay the groundwork for future collaboration and best practice sharing. The team created goals for collaborative research on sustainability and barrel and wood management, and talks will continue during a return visit to Scotland in May 2023.

During the visit, the group also spoke with distillers and suppliers directly while visiting Angel's Envy, Brown-Forman, Maker's Mark, James B. Beam Distilling Co., Independent Stave Company, Limestone Branch, and Wilderness Trail. The Beam Institute hosted and livestreamed a mini symposium with five speakers, including James Brosnan, SWRI director of research and John Connor, SWRI senior scientist.

Talks presented were:

- Steven Schafrik (UK) - Maturation House Monitoring

- Chad Lee (UK) - Kentucky Grains - Bourbon, Whisky & Whiskey
- Seth DeBolt (UK) - White Oak
- James Brosnan (SWRI) – "Scotch Whisky Sustainability & Supply Chain Partnership"
- John Connor (SWRI)– "Maturation – Scotland Style"

Beam Institute Partners with Equine Industries for "Kentucky Signature Industries" Career Fair

By Holly Wiemers

For the first time, the UK College of Agriculture, Food and Environment hosted a reimagined career fair featuring two of the state's most iconic industries: equine and bourbon. The update was a popular one.

The 2022 UK Signature Industries Career Fair on Sept. 29 was open to job seekers both inside and outside of UK and more than 400 participants took advantage of the opportunity. The fair saw participation from 15 different regional colleges and universities and more than 150 recruiters representing 60 employers from the equine and distilling industries.

"I was struck by how many of our students benefited from these programs working together in creative ways and by the support our most iconic Kentucky industries give to our college and its students. It is gratifying to know we are providing opportunities that benefit Kentucky's equine and bourbon industries well into the future," said Nancy Cox, vice president for land-grant engagement and dean for the UK College of Agriculture, Food and Environment.

Both the equine and distilling programs have held separate, well-attended career fairs in past years, but this year was the first time the two industry-focused programs combined forces. In addition to students from outside UK, students from 10 different UK colleges were present, representing 53 different undergraduate and professional majors.

"We are so excited to see the combination of Kentucky's signature industries come to life in efforts to recruit job seekers and highlight career opportunities within each industry," said Savannah Robin, internship coordinator within the equine science and management undergraduate degree program and event co-organizer. "It was a natural fit and we are excited to see how highlighting these industries can continue to shine a light onto the opportunities available. Robin said developing the professional capacity of undergraduate students is essential to their future career success.

"One of the important skills to develop is networking and relationship building," she said. "This career fair is a way to allow students the opportunity to not only practice their skills in real life but truly start building relationships with future employers early on. Watching our students shine as they engaged with stakeholders at the event was one of the highlights of my own career."

"We are excited to have hosted the distillation, wine and

brewing portion of the Kentucky Signature Industries Career Fair for the first time since the start of the COVID pandemic," said Ilka Balk, associate director of the James B. Beam Institute for Kentucky Spirits and event co-organizer. "The strong employer participation shows that there is a great need for talent in the distillation, wine and brewing industry.

Balk said students are well-prepared through the UK Distillation, Wine and Brewing Certificate program to fill the industry's need for talent, and this fair gave many attendees them the first opportunity to show employers their abilities.

"Students and alumni from all Kentucky schools who are interested in the industry were able to meet with employers and market their skill sets as well. The industry is growing exponentially, and there is room for many disciplines and backgrounds. We thank the Kentucky Distillers' Association for their support for this fair and their investment in the distilling talent of the future."

Distilled spirits industry sponsors included the Kentucky Distillers' Association, Beam Suntory, Joseph & Joseph Architects, Wild Turkey, C&I Engineering, Michter's Distillery, River City Distributing and Southern Distillers.

In addition to the sponsoring companies, distilling employers present included Augusta Distillery, Bardstown Bourbon Company, Bluegrass Distillers, Brown-Forman Corporation, Independent Stave Company, Jephtha Creed, Lexington Brewing & Distilling Co., Louisville Distilling Co. LLC, MGP Ingredients, Inc., LuxRow, Ponfeigh Distillery, LLC, Sazerac Company, West Sixth, and Willett Distillery.



The CAFE Signature Industries Career Fair was held in 2022. (Photo Matt Barton)

News relating to the Institute's contributions to education, safety and collaboration

- Apprenticeship Program Enters Its Second Cohort
- Several Safety Training Days Offered by Central Appalachian Regional ERC
- Bardstown Bourbon Chill Haze Meeting
- One Day Whiskey Webinar

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.



The inaugural apprenticeship class. Back row (l to r): Jamie Noel, John Rhodes, Chris Downs, Eric Tarrence, Jim Richard, Andrew Walldridge, Chris Pruitt, Kyle Oyler, David Walldridge. Front row: Ty Stivers, Glenna Joyce (coordinator), Brian Milliner

Apprenticeship Program Enters Its Second Cohort

The James B. Beam Whiskey Apprenticeship Program is the first-of-its-kind Kentucky state-accredited apprenticeship for distillery workers. The apprenticeship is a collaboration between Beam Suntory and the James B. Beam Institute for Kentucky Spirits to provide coursework to Beam Suntory apprentices who work at Fred B. Noe (FBN) Distillery.

The FBN Distillery is where Beam Suntory is crafting its future, super-premium offerings and home to its experimentation in American Whiskey. At the distillery and through the program, apprentices worked closely with Freddie Noe, 8th Generation Beam Distiller & Master Distiller at FBN, to experiment with unique distillation and aging techniques, mash bills, styles, finishes and other levers, increasing their knowledge and charting the future of American Whiskey.

The 2022 inaugural class completed their 200 hours of coursework in September 2022. This major accomplishment was celebrated in the FBN Distillery, where the 13 apprentices took classes in the custom-built classroom. Freddie Noe explained how the inspiration for the apprenticeship program came from a distillery visit in Japan. Harry Rossoll, FBN Distillery manager, spoke on the dedication of the apprentices to their classwork. Glenna Joyce, Beam Institute distilling education coordinator talked about the lasting impact of education and learning.

Each apprentice received a certificate and all signed a “class barrel,” which will be specially aged at the FBN Distillery. Apprentices then led guests on a personalized tour of FBN Distillery, showcasing their expertise and skills learned over the 18 month-program.

Upon completion of on-the-job training, apprentices are now “whiskey specialists,” distillery operators who understand the how and why of every aspect of production, and can communicate their knowledge effectively to VIP guests.

The second apprenticeship program class is projected to graduate in October 2023.

Several Safety Training Days Offered by Central Appalachian Regional ERC

During the past calendar year, the Central Appalachian Education and Research Center, in partnership with the Beam Institute and Beam Suntory, conducted three training sessions for the distillery community.

The training days were on distillery emergency response (June 2022), ergonomics (May 2022) and barrel safety (April 2022). The training sessions attracted 58 participants from more than 15 distilleries, in addition to industry consultants, KDA and state government representatives.

The CARERC combines the academic resources of five colleges at the University of Kentucky (UK) and two colleges at Eastern Kentucky University (EKU) to provide a fully equipped and recognized resource for safety and health research and training.

Bardstown Bourbon Chill Haze Meeting

Bourbon’s international growth is driving the need for more Kentucky distilleries to offer bourbon products that are stable in cold temperatures during transit. As more distillers require chill-stable products, there is a need to test the product stability. Methods to determine the stability of bourbon products significantly varies from distiller to distiller. This created a perfect opportunity for collaboration within the distilling community to learn more about chill stability testing and develop analytical best practices. Beam Institute research director Brad Berron partnered with an organizing committee from Beam Suntory, Bardstown Bourbon Company, Campari, Castle & Key, Four Roses, Sazerac and UK to explore existing and emerging analytical tools in chill stability testing.

With a shared goal of ensuring that every LDA consumer in the world consistently tastes only the highest quality bourbon, a team of spirits quality experts from distilleries met at Bardstown Bourbon Company to discuss the strengths and weaknesses of each analytical approach. The group determined clear guidelines for each method. While unbiased guidance is critical to the optimal performance of any company, this collaborative group also provided a significant professional development opportunity for distillery quality professionals. Attendees had a greater ability to contrast their analytical approaches against those used by other Kentucky distillers.

The workshop’s full attendance included professionals from Angels Envy, Brown-Forman, Heaven Hill, IJW, Willett, the University of Louisville, Wilderness Trail and the Kentucky Distillers’ Association. The group possessed an immense depth of analytical expertise, and now each distiller has a deeper network of technical colleagues for collaborative learning. This project highlights how technical collaborations promote the success of bourbon brands across Kentucky.

One Day Whiskey Webinar

The Beam Institute offered a “Whiskey Webinar” in June 2022 to expose new distillery employees and interns, as well as other support industries’ employees, to a broad scope of bourbon-related topics.

Beam Institute education coordinator Glenna Joyce organized the webinar, which offered seven, one-hour modules on topics such as tourism, distillery production, bourbon engineering, fermentation, grains, maturation science and sensory. UK faculty members and Beam Suntory and Maker’s Mark representatives led each module.

The webinar format enabled participation from across the country and allowed participants to ask presenters questions in real time.



The Beam Institute partnered with a team of spirits quality experts to discuss chill stability testing and guidelines.

Apprenticeships

A first-of-its-kind, state-accredited apprenticeship for distillery workers



Industry Talks

Workshops related to product stability and international growth issues



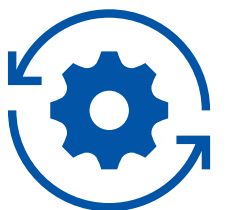
Webinars

Introducing bourbon newcomers to the basics in real-time



Trainings

Prioritizing barrel safety for distilleries in addition to industry consultants



Each apprentice received a certificate and all signed a “class barrel,” which will be specially aged at the FBN Distillery.



Three CARERC and Beam Institute trainings took place in 2022.

For more information, visit the Beam Institute website at <http://beaminstitute.ca.uky.edu>.



Distillation, Wine and Brewing Certificate

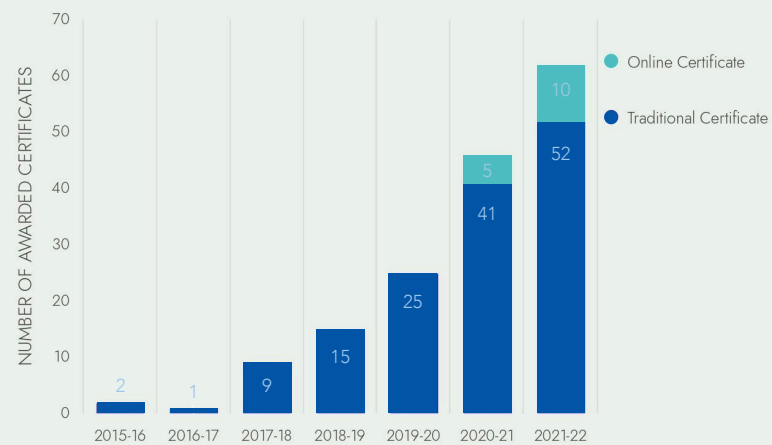
In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.

News relating to the Institute's contributions to scholarship and student preparation

- More than 50 Students Complete Distillation, Wine and Brewing Certificate in 21-22 Academic Year
- Thompson Scholarship 2022-2023 Awards
- On the Rocks Class – Geology of Bourbon and Beer Reaches Maximum Enrollment
- Study program in St. Croix/US Virgin Islands Planned for the Summer of 2023
- UK Student Interns are Part of Buffalo Trace's Archive Work
- Bourbon Oral History Project Continues in 2023 as a Graduate and Undergraduate Class

EXPONENTIAL GROWTH

Distillation, Wine and Brewing Studies Certificates Awarded



The number of students who have completed the Distilling, Wine, and Brewing Studies certificate has increased every year between 35%-65%

More than 50 Students Complete the Distillation, Wine and Brewing Certificate in the 2021-2022 Academic Year

In the 2021-2022 academic year, the Distillation, Wine and Brewing Certificate at the University of Kentucky continued its exponential growth. All in all, 62 students completed the UK Distillation, Wine and Brewing Studies Certificate. The graph below shows the growth of the certificate program based on the number of certificate completions since 2016.

Thompson Scholarship 2022-2023 Awards

The Hank and Kathy Thompson Scholarship awards \$5,000 annually to one or two students in the Distillation, Wine and Brewing Program at the University of Kentucky. Jake Parry and Abigail Van Wyk are the recipients of the 2022-23 scholarship.

Abigail Van Wyk is a Chemical Engineering Student who found her passion for distilling through Chemical Engineering Coursework, research and meeting a role model: It “wasn’t until taking ‘Separation Process’ with Dr. Berron that I genuinely started to have an interest in the bourbon industry specifically. ... It was extremely interesting to learn more about how various spirits can be transformed and reimaged using distillation, especially when it came to bourbon specifically. Even while taking this

class, I still felt a little indecisive regarding whether I should go through with this certificate, but right at this feeling entered, it left after attending a class with a guest lecturer, Alex Castle, the Master Distiller from Old Dominick Distillery. When she spoke to my class, she explained going through the same issues and struggles that I had been feeling for a long time and instantly knew that I could learn a lot from her. She described how, at the

University of Kentucky, she majored in chemical engineering, just as I do, but was greatly struggling with what to do after she graduated....At that moment, it finally hit me: I want to become a master distiller in the future.”

Jake Parry is a Hospitality Management and Tourism major in the College of Agriculture, Food and Environment at UK.



“As a member of the craft food and beverage industry for the last five years, I have fully immersed myself in the production, sales, and marketing of craft spirits and beer....and decided that I wanted to further my education on alcohol as a whole so that I may be able to develop my own full-time career in the industry. ... Through

these experiences as well as the multiple classes I have taken in the DBW as a full-time student and professional, I have been able to learn some pertinent information to help me further my career in the field.

The main reason for moving to Lexington from Baltimore in the first place was to finish my undergraduate degree while completing the DWB certificate program.”

On the Rocks – The Geology of Beer, Wine and Spirit Alcohol Reaches Maximum Enrollment

The fall 2022 undergraduate course “On the Rocks – The Geology of Beer, Wine, and Spirit Alcohol” reached an enrollment milestone of 100 undergraduate students in only its second offering. The course, developed by Department of Earth and Environmental Science associate professor Michael McGlue, takes a critical zone science (“Earth’s outer skin where rock meets life”) approach to relate the major environmental factors that influence the production of beer, wine and spirit

alcohol. The course is broken into five sections: (1) critical zone basics, including overviews of the atmosphere, hydrosphere, cryosphere, biosphere, and geosphere, (2) the science of beer, (3) the science of wine, (4) the science of distilled spirits, (5) environmental history and geoarchaeology and (6) bourbon in the Bluegrass.

Sections 2, 3 and 4 take a case study approach, where “famous bottles” of beer, wine, and spirits help contextualize critical zones across the globe that have become renowned for alcoholic beverage production. In section 5, the course explores how key events in environmental (e.g., climate change, volcanism, wildfires) and human history (e.g., the Neolithic and Industrial Revolutions) have influenced these areas. Section 6 emphasizes the unique convergence of environmental, geological and cultural conditions in Kentucky that have allowed the bourbon tradition to flourish.

The course endeavors to provide a sense of place for students living and studying in the Bluegrass region from the perspective of environmental earth science. The course will be proposed as a formal addition to the course catalog in the coming academic year, with the hope that it will become a regular offering to dovetail with the Beam Institute’s Distillation, Wine and Brewing Studies certificate. During his next sabbatical, professor McGlue plans to develop a course textbook and a set of virtual field trips so students may explore the topic in greater detail.

Study program in St. Croix/U.S. Virgin Islands Planned for the Summer of 2023

For the first time, the Distillation, Wine and Brewing certificate foundation course, HRT 335, will go on location in 2023. Beam Institute director Seth DeBolt, will teach the science of distillation, wine and brewing via online modules in May and June, before the group of 12 students departs in July. The group will travel to St. Croix to visit Cruzan Rum, Captain Morgan Rum, Mutiny Vodka - a local vodka distiller seeking to use local breadfruit for their production, Leatherback Brewing Co., as well as the University of the Virgin Islands’ (UVI) Agricultural Research Station and the UVI School of Agriculture.



Barrels steaming in St. Croix, the location of a DWB Certificate trip in 2023.

UK Student Interns are Part of Buffalo Trace’s Archive Work

Over the past year, two students interned at Buffalo Trace to support Nick Laracuente, Sazerac’s Archivist on site at the historic distillery. He said about the students that “they came from business and pre-law programs and both had an interest in history and the distilling industry. Since our corporate archives intersect so many disciplines, they were able to apply skills from their university studies while working on historic trademark, advertising, and business administration documents. Taking ownership of their positions they were supported in creative projects with various brand managers seeing at least one project through to the delivery of a creative product to an external customer.”

Blair Fraley said about her work at Buffalo Trace: “Buffalo Trace Distillery gave me an opportunity to have a professional workplace experience while also gaining invaluable connections for my future career. Working with Nick gave me a perspective into the history of distilled spirits not only in Kentucky, but the entire world. I encourage everyone who has the chance to work with the archives program to take it - the staff at Buffalo Trace is the best! ”

Taylor Davis described her experience in the following way: “I learned about the archives intern position at Buffalo Trace Distillery through connections in the distillation certificate program at UK. This internship was a great opportunity to see how a distillery functioned, learn the history behind bourbon, and gain a perspective on how the bourbon industry has changed over time Working in the archives was very multifaceted and really allowed me hands on experiences with artifacts. Getting to walk around the distillery multiple times a week also allowed for a lot of experiential learning! Nick Laracuente ... is an amazing mentor and person to learn from! His passion for bourbon really is contagious and made the internship very engaging with many opportunities to learn and grow different skill sets. I really loved and value the time that I spent as an intern at Buffalo Trace Distillery!”

Bourbon Oral History Project Continues in 2023 as Graduate/Undergraduate Class

Professor Janice Fernheimer is again offering WRD 569/HIS 599: Composing Oral History: Bourbon Oral History in spring 2023. The course seeks to continue to build the historical bourbon record by interviewing women bourbon industry experts, leaders and insiders. Students will learn about oral history as a method, bourbon as an industry, and the art of interviewing itself. By semester’s end students will know how to craft a strong set of questions, conduct an original oral history interview, reflect on their process, and create persuasive materials aimed at public audiences.

Interviews will be archived in the Louie B. Nunn Center for Oral History as part of the Women in Bourbon Oral History Project. This course also fulfills part of the requirements for the Distillation, Wine, and Brewing Studies certificate. More information is available at kentuckyoralhistory.org.

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.

News relating to Institute alumni and their contributions to the bourbon and spirits industries

- Distillation Certificate Graduate and UK Chemical Engineering Alumnus Named Head Distiller at James E. Pepper
- Distillation Certificate graduate to join the Operations Leadership Program at Sazerac



Dr. Seth DeBolt (left), Director, James B. Beam Institute for Kentucky Spirits, College of Agriculture, Food and Environment; Cody Giles, Distillery Management at the James E. Pepper Distilling Co. and a UK Chemical Engineering graduate and Distillation, Wine and Brewing Undergraduate Certificate Program graduate; and Amir Peay, owner/operator of James E. Pepper Distilling Co.

Distillation Certificate Graduate and UK Chemical Engineering Alumnus Named Head Distiller at James E. Pepper

By Aimee Nielson

When Cody Giles began his studies at the University of Kentucky in 2013, he said he was just going through the motions. But something clicked when he discovered the Distillation, Wine and Brewing Studies program. As a result of his hard work, Giles recently earned the head distiller position at Lexington's James E. Pepper Distillery.

"I wasn't really sure what I was going to do with my chemical engineering major," said Giles, a native of Adair County. "But I started taking classes with Dr. Seth DeBolt and Jeff Wheeler, and I ended up working at the UK Horticulture Research Farm's vineyard and I started thinking about the distilling world, too. I thought it would be a cool career path and Dr. DeBolt helped me make contacts in the industry."

Seth DeBolt is the director of the UK James B. Beam Institute for Kentucky Spirits and a professor in the UK Department of Horticulture in the UK College of Agriculture, Food and Environment. He said Giles found his passion and interest himself and used the Distillation, Wine and Brewing Studies program as a canvas to create a career path where he could build on that passion.



Cody Giles, head distiller at James E. Pepper Distillery, is a graduate of UK's DWB Certificate program.

"This is what we want to keep building in the program," DeBolt said. "He's worked really hard to learn every aspect of this industry. We want him to be a role model for the next generation. This kind of example stretches across all sorts of jobs in the spirits industry."

Giles has been working at James E. Pepper Distillery, DSP-KY-5, since it recommenced distillation at the historic property

in 2017. He started immediately after graduation and learned every facet of the operation. DSP refers to federal distillery permits, and the number has historical meaning—James E. Pepper was the fifth distillery in Kentucky to receive a permit.

"Being part of something with a real, authentic history and authentic story definitely helps me put myself behind the product and the brand." Cody Giles, head distiller for James E. Pepper Distillery.

"I think everyone wants to be part of a really awesome story," he said of working for Pepper. "Being part of something with a real, authentic history and authentic story definitely helps me put myself behind the product and the brand."

The storied brand began in 1780, during the American Revolution, and along with the distillery in Lexington, was in operation until 1967. The brand and distillery went through various ownership changes, and the current distillery sat abandoned for more than 50 years before Amir Peay revived the brand and worked with partners in Lexington to rebuild the distillery. Peay has always been passionate about whiskey and American history. He discovered the lost legacy of the Pepper brand and distillery and became intrigued with the story and the project to relaunch, in his words, "a piece of Americana."

"As soon as we began to put together a plan to rebuild the historic distillery here, I knew I wanted to work with the community and with the University (of Kentucky)," Peay said. "I connected with Dr. DeBolt and we began to talk about ideas and he began to visit the distillery and bring students here when it was still a construction site. As we grew and developed, we continued to collaborate and hire students as interns. It's been a really great relationship."

Peay said he hired Giles when the distillery was nearing the end of construction.

"He was here for the day we filled that very first barrel," Peay said. "He was a talent right out of school and showed a real dedication and desire to work in the industry. Since then, he has developed into a great distiller and leader, and I am very excited to continue working with him in his new role."

DeBolt said partners like Peay and James E. Pepper Distillery are what make the program such a success.

"They've really looked to support the students as they come in as interns," DeBolt said. "Cody worked under head distiller Aaron Schorch at Pepper. He was a mentor and a teacher. That really supports this community and Kentucky as well. It gets the next generation thinking about bringing in interns and teaching them; even if they don't stay in that distillery, they can teach them to be very valuable in the industry going forward."

Distillation Certificate graduate Grace Outlaw to join the Operations Leadership Program at Sazerac

Grace Outlaw, is a May 2023 Chemical Engineering and Distillation, Wine, and Brewing certificate graduate. She is set to join the Operations Leadership Program at Sazerac.

[Distilleries have] really looked to support the students as they come in as interns. ... Even if they don't stay in that distillery, they teach them to be very valuable in the industry going forward.

"Upon graduation, I am excited to have the opportunity to be working with Sazerac in their Operations Leadership



Development Program. The Leadership Development Program is a 24-month program that will span 3-4 rotations involving various departments including: bottling, processing, maintenance, and distribution/supply chain. I originally learned about the job from speaking with an engineer at Sazerac during the

2022 Kentucky Signature Industries Career Fair at the University of Kentucky and became interested in the opportunities the program can provide and was encouraged to apply. Prior to the career fair, I met with Zach Fuqua, Director of Career Development in the Engineering Career and Co-op Center, to ensure that I had a strong resume prepared to present to employers.

Through the University of Kentucky, I have had the opportunity to do research under Dr. Brad Berron, the Research Director of the James B. Beam Institute for Kentucky Spirits and have had the opportunity to tour distilleries around Kentucky. While conducting my research I was able to get hands on experience in the bourbon industry, particularly at Four Roses Bottling facility with in-line blending. The implementation of the Distillation, Wine, and Brewing certificate has allowed me to take interesting classes such as Bourbon Production Engineering, Wine Appreciation, Brewing Science and Technology, and Distillation, Wine, and Brewing Science. These courses have given me experience in brewing my own beer at home, sensory exercises, and a strong vocabulary to have meaningful conversations with distillers and enthusiasts.

Completing the research and the distillation, wine, and brewing courses have given me confidence in my abilities and assured me that this is the industry I would like to enter upon graduation. I have thoroughly enjoyed my experience through the College of Engineering at the University of Kentucky and the Distillation, Wine, Brewing certificate. I feel prepared for entering the workforce upon graduation and I am confident that I will be able to be a valuable member of the Sazerac Team. Go Cats!"

So far, Sazerac has made 10 offers for full time and internship positions to University of Kentucky graduating seniors and summer interns for 2023.

News relating to Institute research and facilities, designed to address tangible needs of Kentucky's spirits industry

- Grain Innovation to Benefit Farmers and Distillers
- Water, Sustainability, and Fermentation
- Liquid flows during Maturation
- The Next Generation of Product Blending
- Future Research
- Building Update

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.



Grain Innovation to Benefit Farmers and Distillers

The Beam Institute is fully invested in developing the next generation of grains that will support a holistic view of sustainability while delivering premium distilled spirits. To paraphrase our friend Dave Carpenter at Jephtha Creed, “Stills get the glory, but grains set the stage.” Faculty Fellows from the University of Kentucky’s College of Agriculture Food and then Environment are aggressively pursuing agricultural innovations that will support our thriving farming and distilling communities.

At a minimum, Bourbon must be made from at least 51% corn. Institute director Seth DeBolt is looking to the past to discover new flavors in corn. Postdoctoral scholars Dr. Virginia Verges and Dr. Jarrad Gollihue, UK Horticulture Farm Director Steve Diver, and undergraduate students Jake Patty and Natalie Harris are meticulously cultivating varieties of heirloom corn cultivars and determining their role in distillate flavor. Their scientific approach brings a lifecycle view of the needs in developing a new grain for distilled spirits. Careful tracking of crop yields, growth conditions, plant nutrition provides the Kentucky grains industry the data required to determine the economic potential of these sought after grains. Simultaneously, analysis of fermentation and sensory profiles of these grains allows distillers to understand how to best leverage these premium grains in their product portfolio.

Rye is the second most abundant grain in bourbon. Beam Institute Faculty Fellows Dr. Chad Lee and Dr. Dave Van Sanford are working with Brown-Forman and the Kentucky Small Grains Council to develop a flavorful Kentucky Rye that grows well in our local climate. Their research findings are set for release at the 2023 Beam Institute Industry Conference in March.

The Beam Institute launched a partnership in December 2022 with Dr. Patrick Hayes and Campbell Morrissy at Oregon State University and Harmonie Bettenhausen at Hartwick Community College to develop novel malted barleys that produce flavorful distillates while minimizing potentially dangerous glycosidic nitrile compounds.

We look forward to seeing this partnership grow as our distilling community continues to seek out innovative malted barley products.

Faculty Fellows from the University of Kentucky’s College of Agriculture Food and Environment are aggressively pursuing agricultural innovations that will support our thriving farming and distilling communities.

The Next Generation of Product Blending

Beam Institute Research Director Brad Berron is leading an engineering study to increase the production rate of high value single-barrel products. For single barrel product, the adjustment of proof is frequently the slowest and most error-prone step. Each barrel must be weighed, alcohol content measured, and then water is carefully added to reach a target proof. UK students Johnna Campbell, Riley Neill, and Grace Outlaw are working with Four Roses Distillery and JCS Process & Control Systems to demonstrate how two new automation techniques increase blending accuracy while speeding up the process.

Liquid flows during Maturation

Maturation in fresh charred oak barrels is essential to bourbon’s characteristic sensory experience. Beam Institute faculty fellow Dr. Savio Poovathingal is deploying computerized tomographic imaging commonly used in CT-scans medical imaging to gain new insights into how spirits move through wood during maturation. In these studies, the bourbon industry is getting its first look at the tylose structures in wood that are critical to sealing American white oak against liquid loss. This team is collaborating with Dr. Jarrad Gollihue and Dr. Brad Berron to understand how liquids move through oak and how these structures impact the liquid flows that become the angels’ share. This project is an excellent example of how Faculty Fellows from across the Beam Institute collectively contribute to the betterment of the bourbon industry through fundamental research. These studies will allow us to better understand how oak structure controls everything from maturation losses, proof changes during maturation, and the types of flavors pulled into the spirit from the wood.



Water, Sustainability, and Fermentation

The Beam Institute is committed to improving the sustainability of the distilled spirits industry, and water scarcity is an increasing national and international concern. In 2022, Dr. Tyler Barzee worked with the Bardstown Bourbon Company and Roger Henley to understand how water can be reclaimed from the bottling process. The water used to adjust the proof of a bourbon is extensively purified to ensure that the flavor of the bottled whiskey shines. The purification process produces a stream of mineral rich water that ordinarily is wasted.

This research project looks to use take advantage of this abundant water resource and the minerals that can help fermentation. Early results are promising, and this type of research could significantly reduce water consumption for distillers of every scale within Kentucky and beyond.

Future Research

With the 2023 opening of the Beam Institute Building and the Boswell Family and Independent Stave Company maturation house, our capacity for researching every aspect of spirits innovation will be significantly expanded. Small scale studies will continue at the benchtop scale, but new opportunities are emerging to pilot new grains, enzymes, yeast, and process equipment under the watchful eyes of our Faculty Fellows.

We invite you to reach out to our team to learn more about a new confidential or public partnership with the Beam Institute can elevate your business and the industry as a whole.

Industry members are collaborating to understand how liquids move through oak, seen here in East Bernstadt, Kentucky, during maturation.



Building Update

In the early fall of 2022, the construction of the Boswell Family Maturation House and the James B. Beam Institute for Kentucky Spirits distillery and classroom building started after months of underground utility work.

The maturation house, which will hold up to 600 barrels, includes the K-Rax barrel storage system. The only one of its kind in the United States, the warehouse will become an interactive classroom and laboratory where students and scientists can tackle real-life industry issues. The building is nearing completion at the time of this report in early 2023.

The distillery building foundation and the steel structure and roof are finished as of January 2023. The facility will contain a still house, classroom, office spaces, and an analytical laboratory and is projected to be finished in the summer of 2023.

For more, visit beam.institute.ca.uky.edu.

The maturation house will hold up to 600 barrels and the distillery building will contain a still house, classroom, office spaces and an analytical lab.



welcome to the
**ANNUAL BEAM
INSTITUTE INDUSTRY
CONFERENCE**

JAMES B. BEAM
K-Y INSTITUTE U-S
University of Kentucky

Div
and
th

In creating exceptional teaching, research and outreach programs, the James B. Beam Institute for Kentucky Spirits is a leader for Kentucky's spirits industry from farm to product.

News relating to the Institute's annual conference, three days of invaluable industry education and networking

- 2023 Conference
- Conference Planning Committee
- Conference Partners
- Update on 2024 Conference



2020 Beam Institute Conference

2023 Conference Schedule

The schedule for the March 2023 annual conference is again filled with technical talks and continues the theme of sharing knowledge. The conference is scheduled from March 13-15, 2023 and different topics headline each day.

Monday, March 13
Business, Craft, Inclusion and Entrepreneurship

Tuesday, March 14
Distilling Technical Talks

Wednesday, March 15
Sustainability

Conference Planning Committee

Thanks to the conference planning committee members:

Dustin Adams
Ilka Balk
Lisa Banner
Sara Barnes
Seth DeBolt
Brad Berron
Jarrad Gollihue
Jordan John
Glenna Joyce
Aimee Nielson
Hayley Pierce
Noah Rothbaum
Kim Sayre
Colleen Thomas
Sarah Caton Walters

Conference Partners

Thank you to all our 2023 conference partners for their contributions to this year's event:



2022 Beam Institute Conference

Save the date for the 5th annual James B. Beam Institute for Kentucky Spirits Industry Conference, set for March 11-13, 2024 in Lexington, Kentucky.

Stay up to date by visiting beam institute.ca.uky.edu

Kentucky Distillers' Association
General Conference Partner



Beam Suntory
Day Partner



Lallemand Biofuels & Distilled Spirits
Technical Session Partner & Experience Partner



American Farmland Trust
Technical Session Partner



Averitt
Technical Session Partner



KPFF Consulting Engineers
Technical Session Partner & Break Partner



Great Western Malting
Lunch Partner



Sazerac
Lunch Partner



3 Rivers Energy Partners
Happy Hour Partner



Malteurop Malting Company
Happy Hour Partner



Shumaker
Breakout Session Partner



AB Biotek
Break Partner



Ale-8-One Bottling Company
Experience Partner



Fermentis
Experience Partner



Highbridge Springs
Experience Partner



Kentucky State University
Experience Partner



2020 Beam Institute Conference



2022 Beam Institute Conference



2022 Beam Institute Conference



beaminstitute.ca.uky.edu