

FOSTERING GROWTH IN INNOVATION

ANNUAL REPORT
Fiscal Year 2018



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FISCAL YEAR 2018

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We want to thank the University of Kentucky (UK) research community for proving us right: *there is an amazing amount of innovation going on at UK!*

This year was a period of growth for our office and UK commercialization capabilities. It was our first full year with a Commercialization & Licensing team, rolling out new marketing materials, licensing strategies and technology partnership initiatives. This growth led to 29 licenses and options executed in FY 18, a 123% increase from last year and the most ever in a year for the University. We also checked up on all previously active licenses, auditing all commercialization agreements and communicating with many licensees to build an ongoing and transparent relationship with them. We hired a new head of marketing and expanded our Strategic Alliances team, resulting in new research and commercialization partnerships with other universities, companies, investment firms, foundations, networks and professional associations. Our Intellectual Property Development (IPD) team managed two new cohorts of OTC Fellows, and rolled out a new process for assisting our Intellectual Property Committee's review of inventions. Additionally, IPD implemented new processes for royalty accounting, invoicing, and compliance reporting. These efforts continued to build and convey our client service culture, resulting in nearly

100 inventions disclosed in the year – almost a 100% increase over last year and another UK annual record. We created an intentional focus on cultivating startups affiliated with UK technology, with support from the Von Allmen Center for Entrepreneurship to develop a New Ventures Team and launch co.create, our new suite of services to assist entrepreneurial faculty related to company formation and growth.

We love to see the excitement around UK innovation. Patent Palooza! was a fantastic event this year, with increased attendance by 50% over last year to see over 100 UK researchers recognized for their discoveries and commercialization successes. We built partnerships with regional universities and Kentucky companies to continue building channels for the transfer of these great ideas to market, and continue to see great opportunity in building state and regionally affiliated networks to collaborate on commercialization.

On behalf of the amazing team here at the UK OTC, I invite you to read through the rest of this report on the state of UK commercialization in FY 18. We all think you will be as excited as we are about the potential that lies in UK's research. Of course, the vision and support from UK's leadership - in particular, President Eli Capilouto, Vice President for Research, Lisa Cassis, and Associate Vice President for Research & Innovation, Rodney Andrews - deserves a large deal of appreciation from all involved.

You can keep up with us on a more frequent basis by following us on LinkedIn and Twitter, and by subscribing to our monthly newsletter, Commercialization Connect.

Sincerely,

Ian D. McClure
Director, OTC



“The University of Kentucky has a rich history in developing technology that transforms the marketplace and improves the health and well-being of those we serve. Each breakthrough starts with an idea, and UK faculty and staff entrepreneurs carry with them a legacy of new ideas, technologies, and inventions manifest in UK's more than 600 worldwide patent assets. UK Research and the Office of Technology Commercialization are integral elements of our commercialization pipeline, and pioneering new innovations is fundamental to our role as the University for Kentucky.”

—Eli Capilouto,
University of Kentucky President

“Working together across disciplines, UK researchers are envisioning new approaches to challenges, developing new solutions to intractable problems, and creating new products to improve lives. Solutions to our real-life challenges in Kentucky are applicable worldwide, and our researchers are engaged in vital commercialization to achieve that reach.”

—Lisa Cassis, Ph.D.
Vice President for Research



THE OTC TEAM



IAN MCCLURE
Director

INTELLECTUAL PROPERTY DEVELOPMENT TEAM



DON KEACH
Associate Director



SABRINA DARNELL
Intellectual Property/Compliance
Coordinator



KAYTO BUCHANON
Student
Intellectual Property Assistant



KATIE OLSON
Student
Intellectual Property Assistant

STRATEGIC ALLIANCES TEAM



TAUNYA PHILLIPS
Associate Director



MARIAM GORJIAN
New Ventures Manager



JACQUELINE J. GREENE
Marketing Coordinator



TANNER ANDERSON
Marketing Assistant

TECHNOLOGY COMMERCIALIZATION & LICENSING TEAM



ERIC CASTLEN
Associate Director



ALI BOCOOK
Senior Contracts Coordinator



NATASHA JONES
Commercialization Manager



ALEX PORTER
Commercialization Manager

FELLOWS TEAM



MARION COE
Fellow



ISABEL DERERA
Fellow



KAIA HAMPTON
Fellow



MITCH LYON
Fellow



MICHAEL ORR
Fellow



KENDRA STAGGS
Fellow



JOSEPH STEVENS
Fellow

ACCOMPLISHMENTS

ALI BOCOOK: Promoted to Senior Contracts Coordinator

SABRINA DARNELL: Appointed co-chair of the iEdison Compliance Committee for the Association of University Technology Managers (AUTM)

NATASHA JONES: Earned the Certified Licensing Professional™ (CLP) credential

IAN MCCLURE: Selected to IAM-Strategy 300 as one of the world's leading IP strategists in IAM Magazine

TAUNYA PHILLIPS: Appointed to the Midwest Research University Network (MRUN) Board of Directors

\$5,000,000+

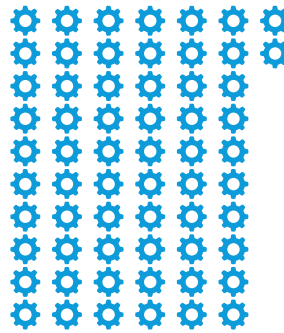
DISTRIBUTED TO INVENTORS SINCE 2010

101 INVENTION DISCLOSURES



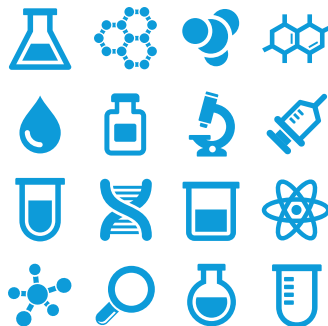
62

PATENT APPLICATIONS



29

NEW LICENSES & OPTIONS EXECUTED



23

PATENTS ISSUED

\$14.62M

DISTRIBUTED TO COLLEGES AND DEPARTMENTS SINCE 2010

\$2,345,029

GROSS ROYALTY INCOME IN FISCAL YEAR

2018

MILESTONES

2017

AUGUST

Partnership with Space Tango *(page 12)*

SEPTEMBER

Partnership with EKU *(page 12)*

OCTOBER

Completed New Website

2018

JANUARY

NIH/NIGMS STTR Grant Proposal Submitted *(page 7)*

FEBRUARY

Launch of Expedited Intellectual Property (IP) Track *(page 7)*

APRIL

Partnership with US WorldMeds *(page 12)*

MAY

Completion of Internal License Agreement Audit

JUNE

Launch of New Ventures Team and co.create Program *(page 13)*

ON THE HORIZON

Launch of Southeast XOR and Midwest XOR Platforms *(page 7)*

Launch of UK Startup Network

CATalyst Fund *(page 7)*

Expedited IP Track

UK Office of Technology Commercialization (OTC) and the UK Office of Sponsored Projects Administration (OSPA) announced the pilot of a new “Expedited IP Track” program offering for corporate sponsored research partners hoping to minimize time and transaction costs associated with negotiating sponsored research agreements.



National Institutes of Health (NIH) – National Institute for General Medical Sciences (NIGMS) STTR Regional Tech Transfer Accelerator Hub for IDeA States

The Office of Technology Commercialization (OTC) submitted a NIH-NIGMS STTR grant proposal in January 2018. The University of Kentucky was the lead academic institution, with University of Louisville and West Virginia University as partners, in a consortium of 24 universities in the southeast and Puerto Rico. The principle investigator on the proposal is Ian McClure, director of OTC with XLERateHealth, a technology accelerator located in Louisville who specializes in biomedical innovations, as the small business partner. The application proposes to create a coordinated network and commercialization resources of accelerators throughout the Southeast IDeA Region (Arkansas, Kentucky, Louisiana, Mississippi, Puerto Rico, South Carolina, and West Virginia). The goal is to enhance the capacity to move scientific results from academic institutions into commercialization and promote a sustainable culture of biomedical entrepreneurship within IDeA states.

CATalyst

The Office of Technology Commercialization (OTC) is working diligently to activate CATalyst, the first ever University of Kentucky Commercialization Fund. This fund will be established to enhance development of inventions that have been disclosed to the OTC. The funding should enable a project to reach milestones along the commercialization pathway. Agreed upon milestones are expected to be met over the one-year funding period. Be on the lookout for more details coming soon.



Southeast XOR and Midwest XOR Platforms

The Southeast Executives-on-Roster (XOR) is a collaboration between 14 Southeastern Conference (SEC) universities, and the Midwest Executives-on-Roster (XOR) is a collaboration between 11 other Midwest universities. These universities have jointly created these online platforms to broaden access to experienced entrepreneurial talent and to match that talent to university-affiliated startups in need of executive management.

60 TOTAL ACTIVE STARTUPS RELATED TO UK TECHNOLOGY

46 LICENSE AGREEMENTS THAT GENERATED INCOME IN FY 2018

6 UK STARTUP COMPANIES FORMED IN FY 2018

- ConusRx, Inc.
- Flaming Fox, LLC
- Parcure, LLC
- Enepret, Inc.
- Kangaroo Keeper LLC
- Thoroughbred Carbon Sciences LLC

5 UK STARTUP COMPANIES THAT RECEIVED SBIR/STTR FUNDING IN FY 2018

- Bluegrass Advanced Materials, LLC – Tom Dziubla and Zach Hilt, Chemical Engineering
- CoPlex Therapeutics LLC – Bert Lynn and Mark Lovell, Chemistry
- Naprogenix, Inc. – John Littleton, Kentucky Tobacco Research Development Center
- Paratechs Corp. – Angelika Fath-Goodin, formerly Entomology
- PowerTech Water LLC – Xin Gao, Center for Applied Energy Research

STARTUP COMPANIES

Thoroughbred Carbon Sciences LLC

Thoroughbred Carbon Sciences LLC is utilizing a University of Kentucky patented process to take bourbon stillage and produce high-quality activated carbons. The research uses a method in which leftover spillage is repurposed from the brewing and distilling process to produce activated carbon. Based on this approach, the carbons can be used for water filtration, high energy storage devices (supercapacitors), fertilizer, black paint (used at horse farms), air filtration, dry lubricants, and in several automotive applications. The research was headed up by Dr. Steve Lipka, associate director, and conducted at the University of Kentucky Center for Applied Energy Research (CAER).



Kangaroo Keeper LLC

Kangaroo Keeper is working towards providing a secure method of giving kangaroo care to intubated infants. Because intubated babies are attached to a ventilator, the process is more intensive to prepare, and more caution is needed to ensure that the baby stays connected to the ventilator. The prototype has been developed by Stephanie Jenkins, a respiratory therapist in the Neonatal Intensive Care Unit (NICU) at the University of Kentucky Children's Hospital. Stephanie is also a graduate of OTC & VACE's UKAccel program.

LICENSES AND OPTIONS FOR FISCAL YEAR 2018

Alkahest

Jayakrishna Ambati (formerly Physiology)
Mark E. Kleinman (formerly Ophthalmology and Visual Sciences)

Arysta LifeScience North America, LLC

Douglas D Archbold (Horticulture)
Marta Nosarzewski (Horticulture)

Avast Therapeutics, LLC (2)

Luke Bradley (Anatomy & Neurobiology)
Don Gash (Anatomy & Neurobiology)
Greg Gerhardt (Anatomy & Neurobiology)

BioLegend, Inc.

John S. Thompson (College of Medicine)
Stephen Brown (College of Medicine)

CBS News Inc.

Seth Parker (College of Engineering)
Jim Griffioen (College of Engineering)

EryDel S.p.A.

Chang-Guo Zhan (College of Pharmacy)
Daquan Gao (formerly College of Pharmacy)
Fang Zheng (College of Pharmacy)
Lei Fang (Forestry and Natural Resources)

ConusRx, Inc. (2)

Peter Crooks (formerly College of Pharmacy)
Linda Dwoskin (College of Pharmacy)
Guangrong Zheng (formerly College of Pharmacy)
Zhenfa Zhang (formerly College of Pharmacy)
Sangeetha Sumithran (formerly College of Pharmacy)
Marharyta Pivavarchyk (formerly College of Pharmacy)

Enepret, Inc.

Joseph Chappell (Plant & Soil Sciences)
Shigeru Okada (formerly Plant & Soil Sciences)
Shuiqin Wu
David Watt (Molecular & Cellular Biochemistry)
Timothy Devarenne (formerly Plant & Soil Sciences)
Thomas Niehaus (formerly Plant & Soil Sciences)
Scott Kinison (formerly College of Pharmacy)
Xun Zhuang (formerly College of Pharmacy)

Epionc, Inc (2)

David S. Watt (Molecular & Cellular Biochemistry)
Chunming Liu (Molecular & Cellular Biochemistry)
Vitaliy Sviripa (College of Pharmacy)
Markos Leggas (College of Pharmacy)

Flaming Fox, LLC

Katherine S. Eddens (formerly College of Public Health)

Flow Max, LLC

Todor Petrov (Mechanical Engineering)
Andrzej Wala (formerly Mining Engineering)

Intervet Inc d/b/a Merck Animal Health

Udeni Balasuriya (formerly Veterinary Science)

Kangaroo Keeper, LLC

Stephanie Jenkins (Neonatal Intensive Care Unit)
Lindsey Marie Tarasenko
Nora Warshawsky (formerly College of Nursing)

Nagase Sanbio Co., Ltd.

Douglas D. Archbold (Horticulture)
Marta Nosarewski (Horticulture)

Nufarm Americas, Inc.

Douglas D. Archbold (Horticulture)
Marta Nosarewski (Horticulture)

Palleon Pharma, Inc.

Steve Estus (Physiology)
Manasi Malik (formerly Biology)
James Simpson (Physiology)

Parcure, LLC

Vivek Rangnekar (College of Medicine)

PowerTech Water LLC

Xin Gao (Center for Applied Energy Research)
Kunlei Liu (Center for Applied Energy Research)
James Landon (College of Engineering)
Ayokunle Omosebi (Center for Applied Energy Research)

Rodeo Therapeutics Corporation

Hsin-Hsiung Tai (formerly College of Pharmacy)

Thoroughbred Carbon Sciences LLC

Stephen Lipka (formerly Center for Applied Energy Research)
Christopher Swartz (Healthcare)

Tonya Roth

Nora Warshawsky (College of Nursing)

Zoetis LLC

Thomas Chambers (Gluck Equine Research Center)

Vanderbilt University, Cumberland Emerging Technology

Vijayakumar Sonar (formerly College of Pharmacy)
Sekhar Konjeti
Joseph Roti Roti
Michael Freeman
Peter Crooks (formerly College of Pharmacy)

Virtua Health, Inc.

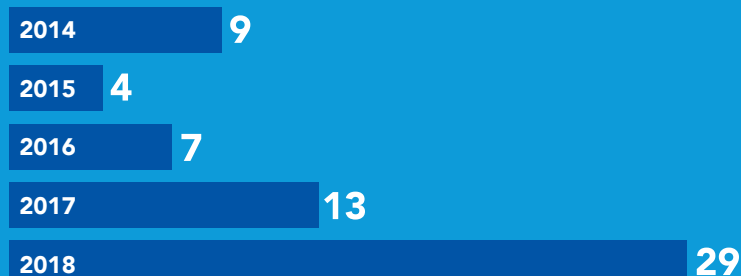
Nora Warshawsky (formerly College of Nursing)

W. Neudorff GmbH KG

Douglas D. Archbold (Horticulture)
Marta Nosarewski (Horticulture)

123%

INCREASE IN LICENSES OVER THE LAST FISCAL YEAR



INNOVATIVE TECHNOLOGIES



Dr. Mark Lovell



Dr. Bert Lynn

Alzheimer's Disease Detection

Dr. Mark Lovell and **Dr. Bert Lynn** developed a method for measuring the concentration of a biomarker in patients diagnosed with or at risk of developing Alzheimer's disease or Mild Cognitive Impairment (MCI). The concentration of the biomarker, called lipocalin-PDS/TTR, is measured in patients; a lower level of this biomarker is indicative of the presence of Alzheimer's disease or MCI. This technology enables rapid screening for and detection of Alzheimer's disease in patients thought to be at risk of having Alzheimer's Disease or MCI.

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Dr. Chang-Guo Zang



Dr. Fang Zheng

Anticocaine Medication

Dr. Chang-Guo Zang, professor in the College of Pharmacy, **Dr. Fang Zheng**, associate professor in the College of Pharmacy, and **Dr. Lei Fang**, visiting scholar in Forestry and Natural Resources, have discovered mutants of a naturally occurring enzyme which metabolizes cocaine in humans. These mutants can metabolize cocaine more quickly and are stable at body temperature longer than other forms of this enzyme. Currently, there are no therapeutics available for cocaine use disorder or cocaine overdose. This enzyme could be administered as a preventative measure to block the stimulant effects of cocaine or as a therapeutic to reverse cocaine overdose.

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Central Venous Access



Dr. John Gurley

John Gurley, professor in the College of Medicine, developed a new method of lead placement for patients with central venous occlusions. Central venous access is a life-sustaining practice that can be complicated by the formation of an occlusion around targeted vessels. This invention describes a novel method for gaining central venous access by establishing a tissue track from the skin

to the vasculature using a series of sharp needle wires pushed and pulled through catheters. In some cases, physicians need access to the central venous system, which is deep beneath the skin. Because there are times the vessels can become occluded after establishing a connection, there is the need for further treatment. Using this method enables physicians to establish access quickly and safely, and to re-acquire access to a site that becomes occluded, which enables physicians to provide the best treatment possible.



Dr. YuMing Zhang

Measuring Welding Torch Orientations

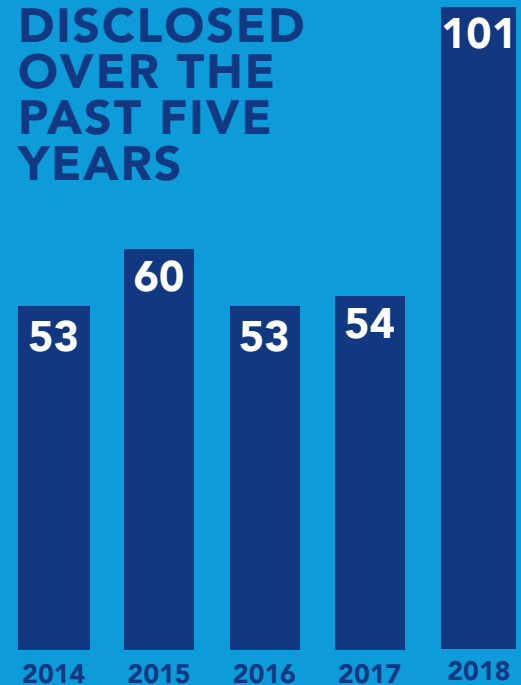
Dr. YuMing Zhang, James R. Boyd professor and director of International Partnerships in electrical and computer engineering, and **Weijie Zhang**, have created an apparatus and method for measuring welding torch orientations throughout a job. Welders adjust the torch orientation during a weld to minimize disturbances in

the process that cause poor weld quality. Mastering this technique often requires long training cycles to learn from experienced welders. This invention allows recording of a welder's adjustments to a torch orientation throughout the job. This data can be used to compare welder techniques to more effectively train welders and improve proficiency.

101

INVENTION DISCLOSURES

INVENTIONS DISCLOSED OVER THE PAST FIVE YEARS



Managing Your Intellectual Property (IP)

■ WHEN DO YOU NEED A MATERIAL TRANSFER AGREEMENT (MTA)?

When research material is leaving the University for another institution or an industry research partner, an MTA is needed to secure the rights of the University and that of the individual researchers including publication rights. When research material is coming into the University, the other institution may require an MTA to be signed.

■ WHEN DO YOU NEED A NON-DISCLOSURE AGREEMENT (NDA)?

An NDA is needed when confidential information is being communicated to someone outside the University of Kentucky. This includes licensing, sponsored projects, commercialization, and research collaboration communications.

■ WHEN DO YOU NEED A DATA USE AGREEMENT (DUA)?

A DUA is needed before there is any use or disclosure of a limited data set to an outside institution or party.

The UK Office of Technology Commercialization (OTC) handles all MTAs and NDAs for University research purposes.

860

TOTAL AGREEMENTS

411

MATERIAL TRANSFER AGREEMENTS

413

NON-DISCLOSURE AGREEMENTS

36

DATA USE AGREEMENTS

PARTNERSHIPS



The University of Kentucky (UK) and Eastern Kentucky University (EKU) became partners in an innovative research commercialization program related to the identification, assessment, and commercialization of discoveries at EKU. In this partnership, the UK Office of Technology Commercialization (OTC) will act as an independently contracted partner and service provider to EKU for intellectual property and commercialization services.

Space Tango

UK OTC and Space Tango have formed a unique partnership to foster basic and applied research in the microgravity environment of space for application on Earth. A focus of the partnership will be primarily in the areas of biotechnology and/or biomedicine that encompasses research and development of medical solutions.



UK OTC announced an important collaborative research project with US WorldMeds, one of the Commonwealth's fastest growing pharma companies, based in Louisville. A letter of intent was signed for the strategic collaboration pertaining to the research and development of US WorldMeds' drug products.

NEW PROGRAMS

The logo for UKWIN, featuring the letters 'UKWIN' in a bold, blue, sans-serif font with a slight 3D effect.

Women Innovators Network

UKWIN

The UK Women Innovators Network (UKWIN) program has a mission to increase the number of UK women who participate in innovation. This includes getting women involved and prepared to take leadership roles in all stages of the commercialization process. UKWIN provides a forum for women innovators that is supportive and allows them to exchange experience, advice, and strategies for taking their innovations to the next level.

The logo for the National Academy of Inventors (NAI), featuring a green circular icon with a white checkmark-like shape inside, followed by the letters 'NAI' in a bold, green, sans-serif font.

NATIONAL ACADEMY OF INVENTORS

UK Chapter of the National Academy of Inventors (NAI)

By forming a local chapter, we can recognize and honor UK innovators who translate their research into inventions that may benefit society. The chapter also serves as a tool to celebrate leaders who foster and nurture innovation at UK.

RECENTLY LAUNCHED

The logo for co.create, featuring the text 'co.create' in a bold, blue, sans-serif font with a slight 3D effect.

co.create offers a suite of services to assist entrepreneurial University of Kentucky faculty, staff and students in the company formation and development process. This suite of services is managed by UK OTC's New Ventures Team with support from the Von Allmen Center for Entrepreneurship.

ENGAGEMENT

FACULTY
EDUCATION



FACULTY EDUCATION PROGRAM

The College of Agriculture, Food, and Environment and the College of Engineering participated in the Faculty Education Program, which is taught by the Office of Technology Commercialization (OTC). The program covers the critical areas of patent research, invention disclosure, patent prosecution, intellectual property (IP)-driven corporate partnering, and new venture creation.

 Office of Technology
Commercialization

COMMERCIALIZATION
CONNECT

MONTHLY EMAIL NEWSLETTER

The OTC newsletter, **Commercialization Connect**, launched a new design in April 2018. **Commercialization Connect** helps connect readers to OTC programs, partnerships, services and other news.

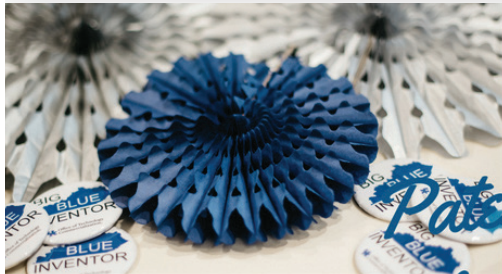


Powering change: Women in innovation and creativity

World Intellectual
Property Day 2018
April 26

WORLD INTELLECTUAL PROPERTY DAY

OTC celebrated its first World Intellectual Property (IP) Day on April 26, 2018. The event theme was **Powering change: Women in innovation and creativity**. OTC provided coffee and pastries while sharing relevant information on the data of University of Kentucky women innovators.



PATENT PALOOZA!

The second annual Patent Palooza! was held March 27, 2018. Recognition was given to inventors on patents, inventors whose patents were licensed, researchers and startup companies who received SBIR/STTR grants, UKAccel graduates, and innovators being recognized by the National Academy of Inventors (NAI).

Special recognition was given to Don Keach, associate director of Intellectual Property Development, for completing over 200 licenses and over 400 patents, and Katherine Adams, special counsel, for all the work she completed for OTC. With over 100 attendees, Patent Palooza! was a wonderful celebration and networking event.

UPCOMING EVENTS

INAUGURAL UK STARTUP
NETWORK KICK-OFF RECEPTION
November 13, 2018
4:00 p.m. – 6:00 p.m.

PATENT PALOOZA!
March 26, 2019
4:00 p.m. – 6:00 p.m.

THANK YOU

Katherine Adams

The University of Kentucky (UK) Office of Technology Commercialization (OTC) wants to thank Katherine Adams for her service to UK research as associate general counsel for Research & Intellectual Property. Katherine spent many years supporting and providing counsel to resolve the many issues that face technology transfer in a university environment. Katherine retired from UK at the end of this past fiscal year and the OTC would not be in its position to support the technology transfer process without her loyal guidance and vast knowledge concerning the legal matters related to the university research system.

“I worked with Katherine on an almost daily basis for two decades. During that time, I grew to value her counsel and friendship. She taught me so much about the law, university governance and most importantly, working with people. I will miss her.”

—Don Keach
Associate Director
Intellectual Property Development Team



 Office of Technology
Commercialization

A141 AS^TeCC Building
145 Graham Avenue
Lexington, KY 40506-0286

research.uky.edu/otc



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