Office of Technology Commercialization

ANNUAL REPORT **2020**

ADVANCING INNOVATION THAT MAKES A DIFFERENCE

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CONNECT

MONTHLY EMAIL

The OTC newsletter, Commercialization Connect, provides all the news happening with UK technology commercialization, startups, regional and national programs, events and gives the audience the opportunity to connect with us.

MONTHLY WEBINARS

OTC hosts monthly webinars to keep our community informed on patenting, licensing, SBIR/STTR, technology commercialization, and much more.

SOCIAL MEDIA

Social media is a great easy way to stay connected with all things OTC. Make sure to follow us on LinkedIn and Twitter and watch our informational videos on YouTube.

linkedin.com/company/uk_otc

twitter.com/uk_otc

youtube.com/channel/UCahBn3PBPunJ_tmmmv1KeeA

WEEKLY EMAIL NEWSLETTER

The StartupLEX weekly newsletter is managed by OTC's New Ventures team and provides access to all the community news and events in Lexington.

Office of the Vice President for Research

THE OFFICE OF TECHNOLOGY COMMERCIALIZATION (OTC) MISSION IS TO ADVANCE INNOVATION THAT MAKES A DIFFERENCE.

OTC supports the university's strategic plan by committing to:

- help build Kentucky's innovation ecosystem and collaborate with industry partners worldwide
- work cooperatively with innovators to strategically assess, protect, and license early-stage technologies
- to cultivate entrepreneurship and co-create new technology startups

DEAR UK INNOVATION COMMUNITY,

While none of us expected the curveball that FY 2020 threw at us, UK OTC was not surprised to see the resiliency of the UK innovation community, which maintained a high level of innovation and commercialization activity. In fact, through the pandemic-induced remote-work period beginning in March, we saw an increase in invention disclosures, patent filings, and license deal activity. One thing is for sure: UK OTC is more emboldened than ever by the spirit, the innovative capacity, and the culture of our research enterprise to realize our office's mission: to advance innovation that makes a difference.

For the third year in a row, we saw new heights in innovation and commercialization activity metrics, with 117 invention disclosures (up 11%), 165 patents filed (up 42%), 29 licenses executed and six new startups created. We handled a 10% increase in MTA/NDA/DUA's (to 1,200+ agreements), evidencing growth in UK's collaborative research. We added four new team members (two grant-funded), welcomed a new head of Intellectual Property Development, Matt Upton, to develop optimal IP strategies for our portfolio, and graduated four OTC Fellows into the world with new professional skills.

I am proud of our team as they rose to the occasion during the pandemic. They worked hard to develop a COVID-19 technologies and partnership webpage, streamline processes and adopt new policies to help these technologies efficiently move to the market. We never let up on our commitment to partnership and service either. With renewed commitment from our partners, the Kentucky Cabinet for Economic Development (KY CED), the University of Louisville (UofL) and Kentucky Science & Technology Corporation (KSTC), we launched Kentucky Commercialization Ventures (KCV) to execute the university commercialization goals of the Commonwealth Commercialization Center (C3), ensuring we support innovation culture at all public institutions across the state. Doubling down on this partnership mission, we continued leading development of the NIGMS-funded XLerator Network alongside our partner, XLerate Health, and we were awarded the NIH REACH (KYNETIC) grant in partnership with UofL and KY CED, and awarded five of the first 7 projects funded by KYNETIC to UK innovators. We continued our work with the UK and Lexington startup community through partnerships with KY CED, Awesome Inc., Base110, Commerce Lexington, and the Bluegrass Angels, completing over 300 startup-related consultations and helping to maintain Lexington's momentum as a vibrant entrepreneurial ecosystem. And how could we go another year without building new things of value for our innovators? In FY 2020, we launched a new statewide-accessible startup accelerator (Launch Blue), a new UK Mentors-in-Residence program, a new UK CATalyst Proof of Concept Fund, a first-ever Founders Hunt entrepreneur-matching event with UofL, and a new Startup License Program (SLP) with favorable terms available specifically to first-time UK faculty entrepreneurs.

As always, none of these accomplishments are realized without the fantastic team of UK OTC professionals, and without the tremendous support of President Eli Capilouto, Vice President for Research Lisa Cassis, and Associate Vice President for Research Rodney Andrews.

Sincerely,

Ian D. McClure
Executive Director, OTC

"While many things have looked different for the health and safety of our community, our mission as the University for Kentucky has never wavered. I am inspired by our Office of Technology Commercialization for their innovative commitment to serve the greater community and achieve what's possible during this time."

Eli Capilouto
University of Kentucky President

"Our Office of Technology Commercialization successfully adapted to the challenges of a global pandemic to propel COVID-19 targeted innovation by our talented faculty and staff investigators. OTC remains the driving force for partnerships between the university, industry, entrepreneurs and business leaders, and their work embodies UK's commitment to improve lives in Kentucky and beyond."

Lisa Cassis, Ph.D.
Vice President for Research

THE OTC TEAM

IAN MCCLURE
Executive Director

ALLISON SPURRIER
Executive Administrative Assistant

LIZ KNAPP
Program Manager, XLerator Network

INTELLECTUAL PROPERTY DEVELOPMENT TEAM

MATT UPTON
Senior Associate Director

SABRINA DARNELL
Intellectual Property/ Compliance Coordinator

JESSICA DAVIS
Data Support Specialist

CARTER KUNSTEK
Student Intellectual Property Assistant

NEW VENTURES & ALLIANCES TEAM

TAUNYA PHILLIPS
Senior Associate Director

ERIC HARTMAN
Associate Director, New Ventures

LAURA RUSSELL-HALLIGAN
New Ventures Manager

EMMANUEL SMITH
New Ventures Manager

JACQUELINE J. GREENE
Marketing and Communications Manager

TIANNA LEWIS
Student Marketing Assistant

COMMERCIALIZATION & LICENSING TEAM

ERIC CASTLEN
Associate Director

NATASHA JONES
Commercialization Manager

RAJA KRISHNAN
Commercialization Manager

ALI BOCOOK YANKEY
Senior Contracts Coordinator

FELLOWS TEAM

BARRET BLOCK

EMMA HOLLAND

MADISON KEARSCHNER

GABRIELLE KEB

AMIR NAJARZADEH

ALEXANDER WILLIAMS

AMBASSADORS TEAM

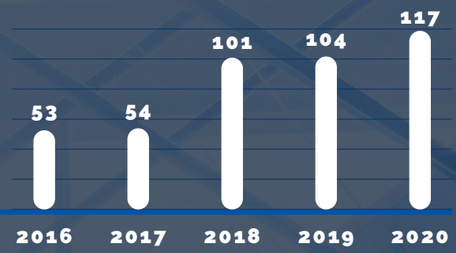
JOHANNA MURRAY

HOLDEN TURNEY

SCOTT VANDERVENTER

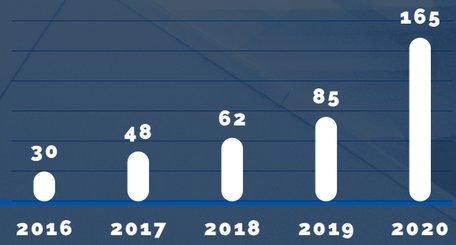
2020 FISCAL YEAR IN REVIEW

117
INVENTION DISCLOSURES SUBMITTED



$5.9 million
DISTRIBUTED TO INVENTORS SINCE 2010

165
PATENT APPLICATIONS FILED



$16.8 million
DISTRIBUTED TO COLLEGES AND DEPARTMENTS SINCE 2010

38
PATENTS ISSUED

29
NEW LICENSES AND OPTIONS EXECUTED

$2,356,523
GROSS ROYALTY INCOME IN FY 2020

1,224
AGREEMENTS PROCESSED

Material Transfer Agreements: 648

Non-Disclosure Agreements: 459

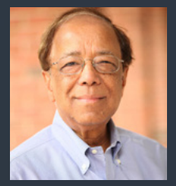
Data Use Agreements: 117

OUR FIGHT AGAINST COVID-19

As COVID-19 changed the way we worked, lived, researched and communicated, the UK OTC team gave considerable thought as to how we could best assist in the fight against COVID-19. While we recognized that the landscape was quickly evolving, we took steps as an organization to support our researchers, connect our potential research partners, move COVID-19 relevant technologies into the marketplace more quickly, and help facilitate and showcase activities by UK startups, innovators and regional companies in support of front-line health care workers. Now more than ever, we are inspired to demonstrate how our university's innovative and entrepreneurial spirit can energize a community and do our part to help solve the world's biggest challenges.

INNOVATIVE TECHNOLOGIES:

1 ANTIVIRAL MEMBRANE MASK

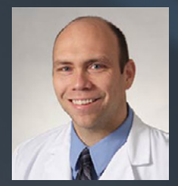


Dibakar Bhattacharyya

UK Alumni Professor, College of Engineering

Capitalizing on the College of Engineering's expertise in membrane sciences, this research team developed a medical face mask that will capture and deactivate COVID-19 on contact. This innovation received a Rapid Response Research (RAPID) grant from the National Science Foundation (NSF).

2 START PROTOCOL



Derek Forster

Medical Director, Infection Prevention and Control (IPAC)

Jill Kolesar

Director, Precision Medicine Center, and professor, College of Pharmacy

The College of Medicine and UK HealthCare launched a START (Serologic Testing to Accelerate Recovery and Transition) trial. The study adopts a proprietary protocol developed by UK and is focused on antibody testing to determine how many people may have already contracted and recovered from COVID-19.

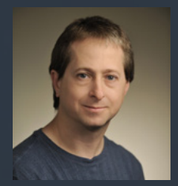
3 ANTIBODY ASSAY FOR COVID-19

Vince Venditto

Assistant Professor, College of Pharmacy

Through strategic collaborations with the College of Medicine and the College of Pharmacy a high throughput serologic assay to screen hundreds of samples per day for antibodies targeting SARS-CoV-2 is being developed.

4 ORAL ZINC TO TREAT COVID-19



Hunter Moseley

Associate Professor, College of Medicine

Zinc represents a highly available nutrient that can be administered in the possible therapeutic dosage range of 100 mg to 200 mg per day for short periods of time with no appreciable toxic effects. Additionally, oral zinc treatment may be synergistic with other drugs being actively studied and used in the treatment of COVID-19.

A YEAR OF ACCOMPLISHMENTS

MILESTONES

JULY 2019
New OTC Mission Developed

OCTOBER 2019
New Senior Associate Director, Intellectual Property Development Hired

OCTOBER 2019
Mentors-in-Residence (MIR) Program Launched

OCTOBER 2019
Startup License Program (SLP) Launched

NOVEMBER 2019
Southeast XLerator Network Phase 11 Funding Received

NOVEMBER 2019
Founder Hunt Partnership Event Held

NOVEMBER 2019
REACH KYNETIC Grant Awarded

JANUARY 2020
CATalyst Proof of Concept Fund Program Launched

JANUARY 2020
e-Apprentice Program Launched

MARCH 2020
COVID-19 Webpage and Technology Portal Launched

APRIL 2020
AUTM's COVID-19 Licensing Guidelines Signed

APRIL 2020
UK and Lexmark Technology Partnership Formed

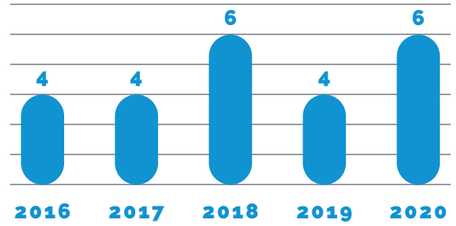
JUNE 2020
Launch Blue Officially Launched

JUNE 2020
Kentucky Commercialization Ventures (KCV) Launched

ON THE HORIZON
- Economic Development Association (EDA) Award
- Development of KY IP Alliance
- Office Re-organization to Enhance Ability to De-risk Technologies Further

UK Startup Companies Formed in Fiscal Year 2020

- AmDx PrognostX, Inc.
- Bioptics Technology LLC
- Rane Innovations, LLC
- TranSyn, Inc.
- Wild Dog Physics, LLC
- W-Z Biotech, LLC.



UK Innovators that Participated in OTC Entrepreneurship Programs

- Dr. Madhumathi Rao, associate professor, College of Medicine
- Clay Larkin, biosystem engineering student, College of Engineering
- Florence Lima, research faculty, College of Medicine
- Dr. Christine Trinkle, associate professor, College of Engineering
- Soroosh Torabi, research assistant, College of Engineering

UK Startup Companies that Received SBIR/STTR Funding in FY 2020

- Bioptics Technology LLC
- ParaTechs Corp (2)
- PowerTech Water, Inc.

Total Active Startups Related to UK Technology

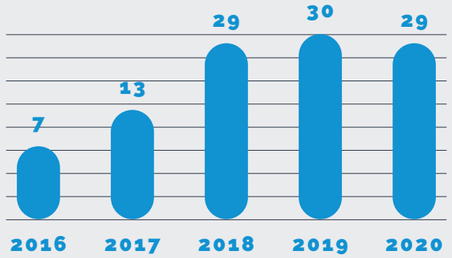
- 68

Startup Company Spotlight

bluegrass advanced materials

Bluegrass Advanced Materials, LLC (BAM) is a UK-startup developing naturally derived antioxidant polymers to be used to improve many commercial applications, including pharmaceuticals, biomedical, foods, cosmetics, plastics, adhesives and lubricants.

NEW LICENSES AND OPTIONS FY 2016 – FY 2020



Increase over Last Five Years: 314%

License Agreements that Generated Income in FY 2020: 33

LICENSES AND OPTIONS FOR FISCAL YEAR 2020

AMDX PROGNOSTX, INC.
Florin Despa
College of Medicine

APPALACHIAN REGIONAL HEALTHCARE, INC
Jeremy Collett
UK HealthCare

AVAST THERAPEUTICS (2)
Luke H. Bradley
Don M. Gash
Greg A. Gerhardt
College of Medicine

BIOPTICS TECHNOLOGY LLC
Guoqiang Yu
Yu Lin
Chong Huang
College of Engineering

CARBON SCIENCE SOLUTIONS, LLC
Stephen Lipka
Christopher R. Swartz
Center for Applied Energy Research

CURIOSITYSTREAM, LLC
Seth Parker
James Griffioen
College of Engineering

ENEPRET, INC.
Joseph Chappell
Thomas D. Niehaus
Shigeru Okada
Timothy P. Devarenne
David S. Watt
Shuiqin Wu
Scott Kinison
College of Agriculture, Food and Environment

EPIONC, INC.
Chunming Liu
David Watt
Mykhaylo Frasinyuk
Jessica Blackburn
Yanqi Zie
College of Medicine

FLOW MAX, LLC
Andrzej M. Wala
Todor P. Petrov
College of Engineering

HACKENSACK MERIDIAN HEALTH
Nora Warshawsky
College of Nursing

KERAFAST, INC.
Louis B. Hersh
College of Medicine

KERAFAST, INC. (5)
Timothy McClintock
College of Medicine

LEXMARK INTERNATIONAL, INC.
Josh Werner
College of Engineering

MERCK ANIMAL HEALTH
Udeni Balasuriya
College of Agriculture, Food and Environment

PUSAN NATIONAL UNIVERSITY COLLEGE OF NURSING
Nora Warshawsky
College of Nursing

RANE INNOVATIONS, LLC
Rebecca Collins
College of Medicine

SPHERIX INCORPORATED
Chang-Guo Zhan
Kyung-Bo Kim
Vinod Kasam
Wooin Lee
Dong-Eun Kim
Zach Miller
Do-Min Lee
Na-Re Lee
College of Pharmacy

STAGE 29 PRODUCTIONS LLC
Michael P. Murphy
College of Medicine

TRANSYN, INC.
Bert Lynn
Mark Lovell
College of Arts and Sciences

UNIVERSITY OF KANSAS
Nora Warshawsky
College of Nursing

VIR BIOTECHNOLOGY, INC.
Edmund Rucker
College of Arts and Sciences

WILD DOG PHYSICS, LLC
Janelle Molloy
College of Medicine

W-Z BIOTECH, LLC
Dongfang Wang
Joseph Zwischenberger
College of Medicine

ZOETIS SERVICES, LLC
Thomas Chambers
Stephanie Reedy
College of Agriculture, Food and Environment

PROGRAMS

CATALYST PROOF-OF-CONCEPT (POC) FUND

OTC launched the CATalyst POC Fund Program to de-risk and better prepare UK technologies with commercial potential for market fit and application. The aim is to accelerate the commercialization of technologies being developed at UK by helping to bridge the funding gap that often exists between idea/discovery and commercialization.

MENTOR-IN-RESIDENCE (MIR)

OTC created the Mentor-in-Residence (MIR) program to deploy subject matter experts (mentors) to assist in coaching and advising UK innovators on turning their technology into viable businesses, products or services.

UKACCEL

UKAccel graduated two teams in spring 2020. The first team was Dr. Madhumathi Rao (College of Medicine), Clay Larkin (College of Engineering), and Florence Lima (College of Medicine). The second team was Dr. Christine Trinkle (College of Engineering) and Soroosh Torabi (College of Engineering). Beginning FY 2021, UKAccel will be hosted through a partnership with Launch Blue and will help UK innovators determine the best commercialization path for their technology.

UKAccel

UKPITCH

UKPitch

UKPitch is an OTC-sponsored commercialization support program for UK researchers who want to pitch their research, technology, intellectual property, or a startup company in a competition or at a conference demo or similar event. This program is a great way to receive some funding to assist in presenting in an environment that promotes the spirit of commercialization or entrepreneurship.

PATENTS BY TECHNOLOGY AREA
FISCAL YEAR 2020

AGRICULTURE
10,383,299 Altercation of Tobacco Alkaloid Content through Modification of Specific Cytochrome P450 Genes
Ralph E. Dewey, Balazs Siminszky, Steven W. Bowen, Lily Gavilano

10,433,544 Herbicide
Douglas Archbold, Marta Nosarzewski

10,687,490 Altercation of Tobacco Alkaloid Content through Modification of Specific Cytochrome P450 Genes
Ralph E. Dewey, Balazs Siminszky, Steven W. Bowen, Lily Gavilano

BIOSYNTHESIS
10,597,665 Method and System for Diterpene Production Platforms in Yeast
Joseph Chappell, Xun Zhuang, Shuiqin Wu

DRUG DELIVERY
10,682,442 Small Molecule Drug Release from In Situ Forming Degradable Scaffolds Incorporating Hydrogels and Bioceramic Microparticles
David Puleo, Todd Milbandt, James Zach Hilt, Paul Fisher, Vishwas Talwalkar

ENERGY
10,457,859 Proppant for Use in Hydraulic Fracturing to Stimulate a Well
Thomas Lee Robl, Anne Elizabeth Oberlink

10,511,023 Fluorinated Coal Derived Carbons and Electrodes for Use in Battery Systems and Similar
Stephen M. Lipka, Christopher R. Schwartz

10,511,061 Low Temperature Liquid Metal Batteries for Energy Storage Applications
Cameron A. Lippert, Kunlei Liu, James Landon, Susan A. Odom, Nicolas E. Holubowitch

ENVIRONMENTAL
10,500,562 Zirconia-based Compositions for Use in Passive NOx Adsorber Devices
Deborah Jayne Harris, David Alastair Seapens, John G. Darab, Mark Crocker, Yaying Ji

10,562,974 Methods of Administering IgG1 Antibodies and Methods of Suppressing Angiogenesis
Jayakrishna Ambati, Sandro De Falco

10,589,214 CO.sub.2 Mass Transfer Enhancement of Aqueous Amine Solvents by Particle Additives
Leland R. Widger, Guojie Qi, Kun Liu, Jonathan Bryant, Cameron A. Lippert, Kunlei Liu

10,669,174 Water Purification Device and a Method of Decontaminating a Water Supply
Dibakar Bhattcharyya, Xiao Li

HEALTHCARE IT
10,430,942 Image Analysis for Predicting Body Weigh in Humans
Jeffrey S. Barrett, Chee Ng

MATERIALS
10,358,535 Thermal Interface Material
Matthew Collins Weisenberger, John Davis Craddock

10,396,175 Nanogaps on Atomically Thin Materials as Non-Volatile Read/Writable Memory Devices
Douglas Robert Strachan, Abhishek Sundararajan, Mathias Joseph Boland

MECHANICAL DEVICE
10,512,983 Method and Apparatus for Measurement of Three-Dimensional Welding Torch Orientation for a Welding Process Without Using a Magnetometer
YuMing Zhang

MEDICAL DEVICES
10,335,296 Graft Within a Graft Endoluminal Graft
David J. Minion

10,667,899 Endoluminal Graft System and Method of Implanting the Same
David J. Minion

10,687,704 System, Device, and Method for Determination of Intraocular Pressure
Jeffrey Todd Hastings, Britt E. Brockman, Ingrid L. St. Omer, John C. Wright

OPHTHALMOLOGY
10,344,095 CCR3 Inhibition for Ocular Angiogenesis and Macular Degeneration
Jayakrishna Ambati

OTHER
10,655,328 Structural Reinforcement, Reinforced Structural Member and Related Method
Issam Elias Harik, Nisal Abheetha Peris

RESEARCH TOOL
10,607,723 Method and System for Identification of Metabolites Using Mass Spectra
Hunter N.B. Moseley, William J. Carreer, Joshua Mitchell, Robert M. Flight

10,648,966 Lipid Bilayer-integrated SPP1 Connector Protein Nanopore and SPP1 Connector Protein Variants for Use as Lipid Bilayer-integrated Nanopore
Peixuan Guo, Shaoying Wang

SCREENING
10,473,670 Method of Predicting Obesity Comprising Measuring Nuerotensin
B. Mark Evers, Jing Li, Paul Dobner, Olle Melander

THERAPEUTICS
10,378,018 RNA-based Compositions and Adjuvants for Prophylactic and Therapeutic Treatment
Peixuan Guo, Hui Li, Emil Khisamutdinov, Daniel Jasinski

10,415,039 Antisense Oligonucleotide Modulators of Serotonin Receptor 2C and Uses Thereof
Stefan Stamm, Manli Shen, Serene Josiah

10,449,186 Phenylethynyl-substituted Benzenes and Heterocycles for the Treatment of Cancer
David S. Watt, Chunming Liu, Vitaliy M. Sviripa, Wen Zhang, Markos Leggas

10,508,150 Methods to Impair Hematologic Cancer Progenitor Cells and Compounds Related Thereto
Craig Jordan

10,512,641 Chloroquine Induction Par-4 and Treatment of Cancer
Vivek M. Rangnekar

10,544,112 Identification of Ebsulfur Analogues with Broad Spectrum Antifungal Activity
Sylvie Garneau-Tsodikova, Huy X. Ngo, Sanjib K. Shrestha
10,584,144 RNA Nanoparticles for Brain Tumor Treatment
Peixuan Guo, Carlo M. Croce, Tae Jin Lee, Farzin Haque, Hui Li

10,604,756 Protection Against Ionizing Radiation and Chemotherapy Toxicity via Latexin Regulation
Gary Van Zant, Ying Liang, Yi Liu

10,668,030 Vesicular Monoamine Transporter-2 Ligands and their Use in the Treatment of Psychostimulant Abuse
Linda P. Dwoskin, Peter Anthony Crooks, Guangrong Zheng, Justin R. Nickell, Zheng Cao, Na-Ra Lee

INVENTION REPORTS BY TECHNOLOGY AREA
FISCAL YEAR 2020

AGRICULTURE

2391 Low Flow Metering Device Based on Two Electronically Activated Solenoid Valves Plumbed in Series
John H. Grove. A.D. Karathanasis, Christopher J. Matocha, Lloyd W. Murdock

2440 Cannabis Sativa (Hemp) Genotypes with <0.0% THC
David F. Hildebrand, Henri Marmillon, Kai Su, Jia Ven Tan

2460 Gene Silencing Kills Bark Beetles Threatening Conifer Forests that Mitigate Climate Change
Bethany Kyre, L.K. Rieske-Kinney, Thais Barros Rodrigues

2487 Nanoscale Device for the Oral Administration of Short Hairpin RNA to Insects to Elicit RNA Interference
Kevin Donohue, Jerome Laisney, Jason Unrine

Assay
2395 Color Map Visualization of the UPDRS Test
George Quintero, Craig Van Horne

BIOFUELS

2416 Oxidative Depolymerized Lignin Compounds for Treating Bacterial Contamination during Fuel Ethanol Fermentation
Ryan M. Kalinoski, Jian Shi

BIOLOGICAL MATERIALS

2437 iGlurR1 Antibody, OET-07 Antibody
Timothy S. McClintock

2445 G12 Antibody
Timothy S. McClintock

2446 G293 Antibody
Timothy S. McClintock

2447 P293 Antibody
Timothy S. McClintock

2448 A-Tubulin Antibody; OET-10 Antibody
Timothy S. McClintock

2474 Beclin 1 Floxed Mouse (Becn1fl)
Edmund Rucker

BIOMARKERS

2420 Novel Human Neuropilin-1 Splice Variants as Biomarkers and Therapeutic Targets in Cancer Metastasis
Xiuping Huang; Qing-Bai She, Qing Ye

2498 Gene Signature for Exceptional Survivors of Advanced Lung Cancer
Vivek M. Rangnekar, Thomas C. Tucker, Chi Wang

2507 Par-4 Loss as a Predictor of Obesity Risk
Nathalia Araujo, Ravshan Burikhanov, Olle Melander, Vivek M. Rangnekar

BIOSYNTHESIS

2466 Synthesis of Novel Hydrophobic Deep Eutectic Solvents from Lignin-derived Compounds
Jameson Hunter, Wenqi Li, Jian Shi, Yuxuan Zhang

DIAGNOSTIC

2469 Unsupervised Detection of High Frequency Oscillations in the Epileptic Brain
Amir Al-Bakri, Sridhar Sunderam

DRUG DELIVERY

2477 Molecular Tags for CNS Drug Delivery
Raymond T. Bartus, Luke H. Bradley, Don M. Gash, Greg A. Gerhardt

2505 (COVID-Related) Nanoparticles Bearing the Coronavirus Spike Protein as a Targeted Delivery System for Anti-Viral Drugs
Barbara Knutson, John M. Littleton, Stephen Rankin, Dennis Trent Rogers

DRUG DEVELOPMENT

2396 Improving the Yield of Protein Production of Butyrylcholinesterase and its Mutants through Sequence Optimization
Xiabin Chen, Chang-Guo Zhan, Fang Zheng

2397 Compounds and Methods to Impair Androgen Receptor (AR) Activation, Impair Dimerization, and/or Impair AR Trans-Regulation
Michael V. Fiandalo, James L. Mohler, Vitaliy M. Sviripa, David S. Watt

ELECTRONIC SENSOR

2409 In-Situ Optical Diagnostics for Barrel Aged Liquids
Michael Renfro

ENERGY

2417 Waste Plastic-Derived Silicon-Based Lithium-Ion Battery Anode Material
Wenqi Li, Jian Shi

2418 A Synthetic Method of Endocarp Lignin-Derived Silicon-Based Lithium-Ion Battery Anode Material
Yang-Tse Cheng, Seth DeBolt, Wenqi Li, Jian Shi

2441 Sliding-Pressure CO2 Capture Process for Stationary Power Generation
Ricky Q. Honaker, Wencai Zhang

2493 Progressive Multi-Staged Liquid Fracking Proppant Injections or "Multi-Frac"
Tristana Duvallet, Robert B. Jewell, Anne E. Oberlink, Thomas L. Robl

ENVIRONMENTAL

2390 An Efficient Non-Clogging Inertial Vortex Type Particle Scrubber
Ashish Ranjan Kumar, Steven Schafrik, Allison Taylor

2491 NH4OH Looping with Membrane Absorber and Distributed Stripper for Enhanced Algae Growth
Mark Crocker, Kunlei Liu, Heather Nikolic

2496 Trash-to-Tank (3T) Processor
Caleb Duckworth, Matthew Gilbert, Chandni A. Joshi, Jeffrey R. Seay

2508 Process to Fabricate Membranes Using Green, Non-Toxic Solvents
Xiaobo Dong, Isabel Escobar

EQUINE

2400 Equine Influenza Virus Isolates
Thomas M. Chambers, Stephanie Reedy

2404 Development of a Novel Organ-On-A-Chip Platform for Veterinary Medicine
Carrie Shaffer

2405 IGF1 as a Marker for Early Injury Detection in Horses
David W. Horohov, Allen Edward Page, John Craig Stewart

2470 Method of Detection
Hartmut H. Malluche

FOOD SCIENCE

2443 Rise: A Probiotic Beverage for Restoring Gut Microflora after Alcohol Consumption
Heather Campbell, Patrick J. Marsac

HEALTHCARE IT

2407 Discharge Tab
Philip Bernard, Jennifer Dorsey, Tammy Lloyd

INDUSTRIAL PROCESSES

2423 Ammoniacal Extraction of Copper, Gold and other Elements of Value
Joshua Werner

2454 Principles of Operation and Control of Regenerated Oxidizer in Countercurrent Leaching Configurations
Joshua Werner

2455 Electrowinning Cells for the Segregation of the Cathodic and Anodic Compartments
Joshua Werner

MACHINE LEARNING

2406 Horizon Line Estimation Using Deep Learning
Nathan Jacobs, Scott Workman, Menghua Zhai

2430 Joint 2D-3D Breast Cancer Classification
Nathan Jacobs, Gongho Liang, Xiaoqin Wang

MATERIALS

2414 Novel Composite Mineralizers/Fluxes for the Production of Alite/Calcium Sulfoaluminate Clinkers and Mechanical Properties of those High Early Strength Development Materials
Tristana Duvallet, Robert B. Jewell, Thomas L. Robl

MEDICAL DEVICES

2411 Flexible Suction Coagulator
Mark Fritz, Moamen Gabr, Guigen Zhang

2431 A Device for the Precision Application/Quantification of Massage Dose
Timothy A. Butterfield, Esther Dupont-Versteedgen

2439 Methods of Dete Polyglucan in Human Biofluids
Ron Bruntz, Matthew S. Gentry, Ramon Sun

2451 Subtalar Arthrodesis Nail Implant System
Arun Aneja, Lorenzo Deveza, Gavin Hautala, Arjun Srinath

2452 Hinged Sheath
David Minion

2453 Tibiotalar Fusion (TTF) Nail
Eric Abbenhaus, Arun Aneja, Lorenzo Deveza, Arjun Srinath

2457 Smart Dental Light
Daniel L. Lau, Howard Roberts, Biyun Xie

2468 Needle Depth Guide
Kyle Murphy

2497 Non-Contact Multi-Wavelength Time-Resolved Laser Speckle Contrast Imaging (MTR-LSCI)
Lei Chen, Chong Huang, Siavash Mazdeyasna, Guoqiang Yu, Mingjun Zhao

OTHER

2410 The Clinical Pharmacokinetics Services & Anticoagulation Guidelines (also known as "The Blue Book")
Aaron Cook, George Davis, Brian Gardner

2421 Compressing H2 Matrices for Translationally Invariant Kernels
Robert J. Adams

2472 Financial and Insurance Navigation Assistant (FINassist)
Jean Edward, Kimberly Northrip

2473 #iCANendthetrend Prevention & Empowerment Program
Joseph Green, Melinda Ickes, Dillon Lay, Haley Leach, Sierrah Miley

2476 (COVID-Related) Forced AQir HEPA Filter Box/Manifold for PAPR Hood
Charles Fletcher

2478 (COVID-Related) Anti-Viral Membrane for Inclusion in Masks and Other Protection Equipment
Dibakar Bhattacharyya

2480 (COVID-Related) Intubation/Extubation Barrier Sheet (IEBS)
Mehdi Khosravi

2484 Handled Doorstop
Darin Robert Cecil

2489 Therapy Sidekick – Home Exercise Program Modality
Jonathan Terry

RESEARCH TOOL

2392 Method for Detection and Quantification of CLN3 Protein
Beatrix M. Ueberheide, Qingjun Wang

2419 Structured Nucleotide-Nanoparticle Advanced Genotyping
Barbara Knutson, Stephen Rankin, Bruce A. Webb

2424 ACL Tear-r-izer
Timothy A. Butterfield, Lindsey Lepley

2471 Chronic Rodent Head Stabilization System for Imaging and Stereotaxic Manipulation
Chris Gant, Pradoldej Sompoi

2481 High Throughput Multiple Solvent Vapor Sorption-Coupled DSC/Raman/NIR Instrument
Amin Abedini, Heather Campbell, Matthew K. Defrese, Patrick J. Marsac, Amir H. Najarzadeh, David Puleo

2482 Laboratory Compaction Simulator
Amin Abedini, Matthew K. Defrese, Patrick J. Marsac, Amir H. Najarzadeh, David Puleo

2499 Mouse Models of Diabetes and Small Vessel Disease with Temporal Control of Human Amylin Transgene Expression
Florin Despa, Sandra Despa, Deepak Kotiya, Gopal Velmurugan

SCREENING TEST

2398 Spirocyclic Dihydrotestosterone as Ligands for Proteolysis Chimeras for AR Degration, Imaging Agents and Screening Tools for the Treatment of Prostate Cancer
Michael V. Fiandalo, James L. Mohler, Vitaliy M. Sviripa, David S. Watt

2399 Spirocyclic Dihydrotestosterone as Ligands for Proteolysis Chimeras for AR Degration, Imaging Agents and Screening Tools for the Treatment of Prostate Cancer
Michael V. Fiandalo, James L. Mohler, Vitaliy M. Sviripa, David S. Watt

2402 Precision Medicine Assessment for Alzheimer's Disease Prevention
Ai-Ling Lin

2427 A Point of Reference System for Anatomic Classification of Aortic Aneurysms
David Minion

2462 A Systematic Structure-Based Virtual Screening Approach to Antibody Selection and Design of a Humanized Antibody Against Multiple Addictive Opioids Without Affecting Treatment Agents Naloxone and Naltrexone
Chang-Guo Zhan, Chunhui Zhang, Fang Zheng

2464 Prediction of Doxorubicin (Dox) Cancer Resistance or Susceptibility using Selected Gene Expressions through RNAseq
Sudhakar Veeranki

2494 Method for Quantifying 5-FU Drug in Plasma at Point-of-Care
Scott Berry, Jill M. Kolesar

Semiconductors & Electronic Devices

2438 A Device for Quality Assurance of Medical Accelerators
Dennis Cheek, Quan Chen, Janelle Molloy

2444 Cradle and Feedback Mechanism for Automated Device Alignment in Radiation Therapy Quality Assurance
Janelle Molloy

2456 Exploration of Non-Volatile MTJ/CMOS Circuits for DPA-Resistant Embedded Hardware
S. Dinesh Kumar, Himanshu Thapliyal

2458 Quantum Circuit Designs of Integer Division
Edgard Munoz-Coreas, Himanshu Thapliyal

2459 Quantum Circuit Designs of a T-Count Optimized Integer Multiplier
Edgard Munoz-Coreas, Himanshu Thapliyal

2506 (COVID-Related) Covered Safe-Entry Scan
Henry G. Dietz

SOFTWARE

2429 SME Efficient Machining Advisor App
Julius Schoop

2449 Machine Learning Determines Plasma Proteins as Predictors of Clinical Outcomes and Identifying Drug Targets in Ischemic Stroke Patients
Qiang Cheng, Justin Fraser, Keith R. Pennypacker

2479 Muffler Analysis Program (MAP)
Tingwen Wu

2500 (COVID-Related) COVID-19 Employee Screening Web Application
Jeremy Collett

2502 Implicit Cybersecurity for the Digital Thread in Manufacturing
Julius Schoop

THERAPEUTIC AID

2394 Gut Microbiome-Derived Metabolite(s) Promote Skeletal Muscle Adaptation to Exercise
John J. McCarthy, Taylor Rees Valentino

THERAPEUTICS

2393 Preparation of Pyrazolo[3,4-b] pyridines as Antimalarials
Scott Charles Eagon, Rodney Kip Guy, Jared Hammill

2401 Lobinaline N-oxides as Positive Allosteric Modulators of the Dopamine Transporter with Potential Value in the Treatment of Substance Abuse Disorders
Greg A. Gerhardt, John M. Littleton, Bert C. Lynn, Dennis Tent Rogers

2403 Novel Superebastine Against Therapy Resistant Prostate Cancer
Ravshan Burikhanov, Vivek M. Rangnekar, Vitaliy M. Sviripa, David S. Watt

2412 Targeted Knockdown of DENND5B Gene Expression as Treatment for Hepatic Steatosis
Scott Gordon

2413 Developing Bruton's Tyrosine Kinase-Targeted Therapies for Pathological and Functional Deficits after Traumatic Spinal Cord Injury
James W. Geddes, Chen-Guang Yu

2415 Inhibitors of Androgen Receptor Activation and Methods of Making and Using Same
Michael V. Fiandalo, James L. Mohler, Vitaliy M. Sviripa, David S. Watt

2422 AP39 Impact on Mitochondria, Metabolism, Gene Transcription Regulation, Cardiotoxicity Protection and Cancer Treatment
Sudhakar Veeranki

2425 Monoclonal Antibodies that Specifically Label a Proteolyzed Pathologic Form of the Protein Phosphatase Calcineurin
Rodney Guttman, Susan D. Kraner, Christopher M. Norris

2426 Treatment of Aneurysms
Yasir AlSiraj, Eric M. Blalock, Lisa A. Cassis, Mark Ensor, Sean Thatcher

2428 Back-up for SJ733, a Novel Antimalarial
Rodney Kip Guy, Jared Hammill

2432 Substituted N-Benzhydrylacetamide Inhibitors of Jumanji Domain Histone Demethylases for the Treatment of Cancer
Chunming Liu, Vitaliy M. Sviripa, David S. Watt, Wen Zhang

2433 Substituted 2-Cinnamoylphenyl Benzoates and Related Heterocycles as Wnt Inhibitors for the Treatment of Cancer
Mykhaylo S. Frasinyuk, Chunming Liu, Xifu Liu, David S. Watt

2434 Distorted Gold(I)-Phosphine Complexes as Antimicrobial Agents
Samuel G. Awuah, Emily Kristen Dennis, Sylvie Garneau-Tsodikova, Jong Hyun Kim

2435 Substituted 2-Amino-4-Aryl-5-Aryloxypyrimidines as Bmi1 Inhibitors for the Treatment of Cancer
Myhaylo S. Frasinyuk, Chunming Liu, Xifu Liu, David S. Watt

2436 Liposomal Itaconic Acid to Modulate Immune Reponses
Michelle Pitts, Vincent J. Venditto

2442 Drugs for GRP78 Cell Surface Translocation and Par-4 Secretion
Ravshan Burikhanov, Vivek M. Rangnekar, David S. Watt

2450 AP39 and Thiolactate (TL) as Novel Anti-Cancer Agents either Alone or in Combination with Other Anti-Cancer Agents
Sudhakar Veeranki

2461 Repurpose Polymerase I Inhibitors
Vandre Casagrande Figueiredo, John J. McCarthy

2463 New Antimalarials Based on the Naphthyridine Carboxamide Scaffold
Robert Barrows, Christopher Davis, Rodney Kip Guy, Jared Hammill, Spencer Knapp

2465 G3BP1 as a Novel Therapeutic Target for Lung Cancer and Other Types of Cancer
Matthew S. Gentry, Ramon Sun, Haining Zhu

2475 Antisense Therapy of GSDMD on Aortopathies
Alan Daugherty, Zhenyu Li, Hong Lu, Congqing Wu, Dien Ye

2483 PLOD2 Inhibitor and its Use
Shike Wang, Ren Xu

2485 (COVID-Related) Orally Administered Zinc in the Treatment of Viruses
Hunter N. Moseley

2486 Use of Antisense Oligonucleotides Targeted Against Angiotensinogen in Marfan Syndrome
Jeff Chen, Alan Daugherty, Hong Lu, Mary Sheppard

2488 The Use of Novel Gold Compounds to Accelerate Repair of Mucosal Injury
Samuel G. Awuah, Terrence A. Barrett

2490 Development of Gold (III)-Dithiocarbamate Modulators of Mitochondrial Respiration
Samuel G. Awuah, Terrence A. Baqrrett

2492 Novel 5-Coordinate Gold-Phosphine Compounds for Biomedicine
Samuel G. Awuah, Jong Hyun Kim

2501 Lapatinib as a Treatment for Ischemic Stroke
Qiang Cheng, Sean Ekins, Justin Fraser, Keith R. Pennypacker

TRAINING TOOL

2408 Congenital Echo Survival Guide
Preeti Ramachandran

WATER TREATMENT

2467 A Novel Method for Extracting Micro- and Nano-Plastics from Water Based on Hydrophobic Eutectic Solven
Jameson Hunter, WEnqi Li, Qing Shao, Jian Shi, Yuxuan Zhang

2495 AiFlushing Enhanced Water Recovery Capacitive Deionization
Xin Gao, James Landon, Kunlei Liu, Ayokunle Omosebi

PARTNERSHIPS

Executives-on-Roster

The University of Kentucky (UK) through the leadership of OTC launched the Southeast and the Midwest Executives-on-Roster (XOR) platforms and programs, which will be merged into one platform in early 2021 by XLerator Network (XLN). This will open up the platform to all higher education institutions and offer more training and resources.

Launch Blue

Launch Blue is an early-stage accelerator program designed to nurture the most promising Kentucky founders with scalable, technology-based startup ideas and empower them to move from the idea stage to successful launch. OTC provides funding support and is one of the organizing partners along with Awesome Inc, Base 110, Bluegrass Angels, Bullard, Commerce Lexington, SBDC, Marrow, and KSTC.

Founder Hunt

OTC collaborated with the University of Louisville (UofL) and the Commonwealth Commercialization Center (created from Kentucky Cabinet for Economic Development funding) to create Founder Hunt. The goal of Founder Hunt is to connect research-backed technologies with startup founders who want to build a company around the technology. Four UK innovators pitched their technology at the inaugural event in November 2019.

OVALS

OTC partners with universities as a consortium through OVALS, which brings several regional universities in the Ohio Valley/Midwest together to share best practices for the advancement of university life sciences technologies, and to focus on best practices for technology transfer.

Kentucky Commercialization Ventures (KCV)

KCV launched in June 2020 and is a state-funded program which provides intellectual property (IP) and tech transfer services to Kentucky's public universities and colleges that currently do not have dedicated IP and tech transfer resources. UK is a partner in KCV through OTC's leadership. Partners include the Kentucky Science and Technology Corporation (KSTC), the Kentucky Council on Postsecondary Education, Kentucky Cabinet for Economic Development (CED), and the University of Louisville (UofL). Ian McClure, OTC's executive director, is a co-founder of KCV.

RISE (Regional Innovations for Startups and Entrepreneurs)

OTC continued to manage UK's role under the RISE initiative from the CED. OTC's New Ventures team has worked strategically with the Lexington community and provided services to both UK and Lexington startups. Under RISE, they have worked with community partners through StartupLEX and the Bluegrass Angels (BGA).

Kentucky Network for Innovation and Commercialization (KYNETIC)

The KYNETIC program supports faculty, staff, trainees, and students who want to accelerate the introduction of their groundbreaking innovations to the marketplace to address unmet needs to benefit human health. The KYNETIC hub is led by UK, CED with support from KCV. Five UK projects received funding in the first cycle.

XLerator Network (XLN)

UK, regional partners and XLerateHealth partnered together through a grant awarded by the National Institute of General Medical Sciences (NIGMS STTR Award UT2GM130174) to develop a regional biomedical technology accelerator hub. During FY 2020, XLN announced seven awardees through the Ideas-To-Products (I2P) Program, created their Small Business Innovation Research (SBIR) 1:1 Assistance Program, and launched their Subject Matter Experts (SMEs) program that created a community of over 200 administrators in the healthcare ecosystem to offer advice to biomedical innovators.

ENGAGEMENT

PATENT PALOOZA
We missed celebrating our amazing innovators and startups due to COVID-19. We are still planning on celebrating and recognizing our FY 2019 and FY 2020 innovators and startups. Updates will be on the Patent Palooza! webpage.

EDUCATION PROGRAM
We started out 2020 with in-person faculty education sessions. Due to the pandemic, we quickly transitioned to education through our OTC Monthly Webinars, which has allowed us to educate faculty innovators from UK and universities across the United States, and Kentucky communities.

To schedule an education session, contact otcinfo@uky.edu.

UK WOMEN INNOVATORS NETWORK (UKWIN) CONFERENCE
In October 2019, we celebrated women innovators with our annual event. Our keynote speaker was Angelique Johnson, CEO and founder of MEMStim, LLC. She gave an energizing presentation titled Think Like an Innovator. Act Like an Entrepreneur. She joined Meghan Marsac, program lead for Cellie Coping Kit for Children, and Pang Hartman, vice president, creative director and lead designer for FrogDice, in an informative innovator and entrepreneur panel. We also participated virtually and on social channels in the "She Started It" campaign in partnership with organizations across Kentucky to celebrate female entrepreneurs for Women's History Month.

UK ENTREPRENEUR SHOWCASE
Due to COVID-19, the UK Entrepreneur Showcase was postponed. Check out the UK Entrepreneur Showcase webpage for updates.

WORLD INTELLECTUAL PROPERTY DAY
World Intellectual Property (IP) Day was April 26, 2020. The theme was Innovate for a Green Future. Mark your calendars for April 26, 2021 and help us celebrate World Intellectual Property (IP) Day.

OTC STAFF AWARDS

OTC awards annual OTC Superlatives to recognize the exemplary individual work of OTC staff members in three areas reflecting core principles of the OTC: Service, Relationships, and Support.

Join us in congratulating this year's SUPER-lative winners!

2019 OTC EXEMPLARY STAFF AWARD

WINNER:
RAJA KRISHNAN
Commercialization Manager

The staff person who, in 2019, best represented OTC's mission statement and actively exhibited the OTC Operating Model in all work activities.

The winner is chosen by the OTC Leadership Team.

2019 OTC SUPPORT AWARD

WINNER:
SABRINA DARNELL
Intellectual Property/ Compliance Coordinator

The staff person who, in 2019, best practiced the OTC Operating Model principle to support others within the office to complete work activities, projects or goals.

The winner is chosen by the OTC Staff.

2019 OTC RELATIONSHIP AWARD

WINNER:
ERIC HARTMAN
Associate Director, New Ventures

The staff person who, in 2019, best exhibited the OTC Operating Model principle to put relationships on a pedestal and built and maintained relationships with others outside the office that created value to OTC.

The winner is chosen by the OTC Staff.

2019 OTC SERVICE AWARD

WINNER:
TAUNYA PHILLIPS
Senior Associate Director, New Ventures & Alliances

The staff person who, in 2019, best exhibited the OTC Operating Model principle to provide exemplary customer service to others outside the office in their work responsibilities.

The winner is chosen by the OTC Staff.

Office of Technology Commercialization

A141 ASTeCC Building
145 Graham Avenue
Lexington, KY 40506-0286

research.uky.edu/otc

University of Kentucky