FCR 22

Office of the President
June 13, 2025

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period January 1, 2025 to March 31, 2025.

Background: At its March 1997 meeting, the Board of Trustees authorized the University of Kentucky Research Foundation to conduct all future copyright and patent filings and prosecutions. Quarterly reports on patent and copyright applications are to be submitted to the Finance Committee of the Board.

Action taken: ☑ Approved ❑ Disapproved ❑ Other_____

PATENT ASSIGNMENTS
For the Period January 1, 2025 TO March 31, 2025

Patents

The following assignments on behalf of the Board of Trustees of the University of Kentucky Research Foundation have been executed:

1. **U.S. Patent Application Number:** 19/015,426
UKRFID: 2314
Filed: January 9, 2025
Title: USE OF NON-CODING NUCLEIC ACID FOR CROP IMPROVEMENT AND PROTECTION AGAINST MICROBES
Inventors: Pradeep Kachroo, Aardra Kachroo, Gah-Hyun Lim and Shine Baby (College of Agriculture, Food and Environment)
Description and Application: This invention includes compounds to confer systemic acquired resistance (SAR) in plants, including a nucleotide sequence derived from trans-acting small interfering RNA3a (TAS3a). The compound is exogenously applied to the target plants. The compound includes specific sequences and modifications such as ribose 2'/3'-ribose modification, 3'-end modification, locked nucleic acids (LNA), conjugation of nanoparticle (NP) or combinations thereof. SAR often leads to resistance at the whole plant level and involves the local generation of signals at the primary infection site followed by their system transport throughout the plant. These signals arm the distal uninfected portions against subsequent secondary infections. The global crop protection market currently exceeds $70 billion with a compound annual growth rate (CAGR) of 5%.
License: Licensed to PhytoGenesis LLC

2. **U.S. Patent Application Number:** 18/992,921
UKRFID: 2660
Filed: January 9, 2025
Title: TRIAZINE LIPIDS, LIPID SYNTHESIS, AND METHODS FOR INHIBITING CANONICAL NFKB TRANSCRIPTIONAL ACTIVITY
Inventors: Vincent Venditto, Abdullah Masud, David Nardo and Julian Mory (College of Pharmacy)
Description and Application: This invention is a novel triazine lipid and a method of synthesis. These novel lipids are used to inhibit canonical NF_kB transcriptional activity during an immune response to an immunostimulatory antigen within a subject. This includes administering a non-viral triazine lipid-based vector with a plurality of triazine lipids to a subject at the same time as an immunostimulatory peptide. The global vaccine market is expected to reach $67 billion by 2026 with a CAGR of 10%.
License: Optioned to Bluegrass Pharmaceuticals, Inc.

3. **U.S. Patent Application Number:** 19/044,196
UKRFID: 2845
Filed: February 8, 2025
Title: WEARABLE SENSOR-BASED DEVICE
Inventors: Sridhar Sunderam and Madison Bates (College of Engineering)
Description and Application: This invention is a wearable device employing hand-mounted sensors to capture finger flexion and force data for objective hand-function assessment, especially relevant for stroke rehabilitation. The system processes this sensor data to quantify performance during tasks and compares it to reference baselines, offering a more precise alternative to subjective clinical evaluations. By providing detailed and continuous monitoring, the device enables personalized rehabilitation programs and progress tracking. The global rehabilitation equipment market is currently $14.8 billion with an expected CAGR of 6%.
License: NA

4. **U.S. Patent Application Number:** 19/102,066
UKRFID: 2654
Filed: February 7, 2025
Title: THIOL ISOMERASES INHIBITORS; PREPARATION THEREOF; AND METHODS OF USE THEREOF
Inventors: Sylvie Garneau-Tsodikova (College of Pharmacy) and Daniel Kennedy (Western New England University)
Description and Application: This invention includes novel thiol isomerase inhibitors and their potential use in treating cancer and preventing cancer-induced thrombosis. These inhibitors target extracellular thiol isomerases PDI, ERp5, ERp57, and ERp72, which play roles in both thrombosis and cancer progression. The application highlights the dual utility of these compounds as both anticancer and antithrombotic agents, potentially addressing a significant unmet medical need in cancer patients. The global enzyme inhibitor market is expected to reach $45 billion by 2034 at a CAGR of 5.37%.
License: Licensed to Quercis Pharma AG

5. **U.S. Patent Application Number:** 19/103,521
UKRFID: 2728
Filed: February 12, 2025
Title: EXTRACTION OF COPPER AND OTHER ELEMENTS FROM WASTE MATERIALS FOR THE PRODUCTION OF METALLIC COPPER
Inventors: Joshua Werner, Lucas Bertucci (College of Engineering) and Kevin Hubert
Description and Application: This invention is a new method to enhance recovery of copper and other valuable metals and materials from waste materials. The new method contacts a waste material stream with an ammonia-based lixiviant adapted to leach copper and other base metals from the waste material feed stream. At this stage copper may be recovered. The stream is then treated with a second lixiviant to leach noble metals from the stream allowing for noble metals recovery. Some embodiments of the novel method include a precipitation reaction to recover gold following the second lixiviant addition. This novel process

may be used in combination with the novel electrowinning cell in UKRF 2455. The global metal recycling market is projected to reach $368 billion by 2030 with a CAGR of 5.2%.
License: N/A

6. **U.S. Patent Application Number:** 19/053,044
UKRFID: 2865
Filed: February 13, 2025
Title: APPARATUS AND METHOD FOR PRODUCTION OF FORMATE FROM CARBON DIOXIDE
Inventors: Kunlei Liu, Jesse Thompson, Ayokunle Omosebi, Leland Wigder, Daniel Moreno (College of Engineering) and James Landon (formerly College of Engineering)
Description and Application: This invention is an innovative apparatus and method for the enzymatic production of formate from carbon dioxide. The system utilizes a dual-cell reactor, separating the electrochemical reduction of a charge carrier in one cell from the enzymatic conversion of CO_2 to formate using an immobilized formate dehydrogenase catalyst in a second cell. This design aims to enhance product selectivity and catalyst stability by decoupling these processes, offering a potential alternative to energy-intensive traditional methods and overcoming limitations of direct electrochemical CO_2 reduction. The growing global focus on carbon capture and utilization technologies positions enzymatic CO_2 conversion systems for formate production in a potentially expanding market for sustainable chemical synthesis. The current global CO_2 market is valued at $11.1 billion and is expected to reach $15.1 billion by 2032.
License: N/A

7. **U.S. Patent Application Number:** 19/054,347
UKRFID: 2893
Filed: February 14, 2025
Title: A BOTTOM-UP APPROACH FOR SUSTAINABLE CULTIVATED MEAT PRODUCTION
Inventors: Ramkumar Annamalai (formerly College of Engineering) and Tyler Barzee (College of Agriculture, Food and Environment)
Description and Application: This invention is a “bottom-up” approach to produce cultivated meat by creating modular tissue components (muscle and fat) separately before assembling them using 3D bioprinting. The method involves culturing muscle cells on filamentous fungal microcarriers to mimic muscle fibers and adipocytes within polyanionic microcapsules to resemble adipose tissue. These cultivated microtissues are then incorporated into bio-inks with hydrogels and extruded layer-by-layer to create structured “marbled” hybrid cultivated meat products, offering a potential solution to the mass transfer limitations of “top-down” methods. With increasing consumer interest and regulatory advancements in the cultivated meat sector, this technology for producing structured products like steaks and filets could tap into a high-value segment of the emerging global market for alternative proteins. The global market for 3D printed meat is expected to reach $959 million by 2033 with a CAGR of 16.1%.
License: N/A

8. **U.S. Patent Application Number:** 19/060,167
UKRFID: 2784
Filed: February 21, 2025
Title: A SURGERY PLATFORM WITH A ROTATING SURFACE ON A STATIONARY BASE WITH INTEGRATED GAS LINES, INTEGRATED HEATING ELEMENTS, AND LEG POSITIONING STRAP SYSTEM
Inventors: Mark Suckow (College of Engineering) and Noe Tirado-Muniz (Office of the Attending Veterinarian)
Description and Application: This invention is a surgical platform designed for small vertebrates, featuring a rotatable upper surface on a stationary base supported by a pillar. The platform integrates gas lines for anesthesia and/or oxygen delivery via a nose cone or endotracheal tube, as well as electrical lines connected to heating elements like heating pads or circulating water pumps to maintain the animal's temperature. A swivel mechanism within the pillar allows the upper platform to rotate without tangling the integrated lines. The platform also includes an adjustable magnetic strap system for secure and repositionable limb restraint, and may optionally incorporate features like mirrors, a light source, magnification and monitoring devices. This design aims to provide surgeons with improved access and maneuverability during small animal surgeries while maintaining a sterile field and consistent delivery of necessary gases and heat. The global veterinary surgical instrument market is currently $1.2 billion with a CAGR of 5.66%.
License: N/A

9. **U.S. Patent Application Number:** 19/109,757
UKRFID: 2709
Filed: March 7, 2025
Title: A METHOD FOR SYNTHESIS OF CATHODE MATERIALS FROM BLACK MASS
Inventors: Jian Shi, Xin Gao, Yuxuan Zhang, Qing Shao, Ahmed Ullah and Ning Wei (College of Engineering)
Description and Application: This invention is a novel method to recycle metal from a spent lithium-ion battery using hydrophobic deep eutectic solvent (DES) systems. Novel hydrophobic DESs have shown great potential to extract lithium, cobalt and nickel at near 100% efficiency. The metal ions can then be extracted from the solution by chemical precipitation. The global lithium-ion battery recycling market is expected to reach $35 billion by 2031 with an expected CAGR of 20%.
License: N/A

10. **U.S. Patent Application Number:** 19/074,111
UKRFID: 2897
Filed: March 7, 2025
Title: SYSTEMS AND METHODS FOR PREDICTING EXTUBATION READINESS
Inventors: Elie Abu Jawdeh (Formerly College of Medicine)
Description and Application: This invention includes systems and methods to predict extubation readiness of preterm infants. The technology uses machine

learning to analyze data from pulse oximeters (measuring oxygen saturation, heart rate, etc.) and ventilators (measuring airway pressure, ventilation mode, etc.). This analysis classifies the patient's lung disease state (acute or chronic), calculates the likelihood of successful extubation and generates a readiness output. This output helps medical professionals determine the optimal timing for extubation, potentially improving patient outcomes and reducing complications associated with prolonged ventilation or failed extubation attempts. The global neonatal intensive care unit market is expected to reach $4.4 billion by 2032 with a CAGR of 6.2%.
License: N/A

11. **U.S. Patent Application Number:** 19/088,898
UKRFID: 2629
Filed: March 24, 2025
Title: DETECTION OF EXPRESSION OF MARKERS USEFUL FOR PREDICTING RISK OF CATASTROPHIC INJURIES IN ATHLETIC ANIMALS
Inventors: Allen Page, James Macleod, David Horohov, Theodore Kalbfleisch and Emma Adams (College of Agriculture, Food and Environment)
Description and Application: This invention is a method for predicting the risk of catastrophic injuries in athletic animals, particularly non-human animals like Thoroughbred racehorses. The method involves obtaining a biological sample, such as blood, and detecting the expression levels of specific genes. The inventors identified a panel of genes, including caveolin-1 (CAV1), caveolae associated protein 1 (CAVIN1) and PR domain containing 16 (PRDM16), whose altered expression levels can serve as biomarkers indicating an increased risk of these severe injuries. By comparing gene expression to a baseline or by monitoring changes in gene expression over time in an individual animal, this technology aims to identify animals at higher risk, allowing for earlier intervention and potentially reducing the incidence of fatal or career-ending injuries. The preferred method for detecting gene expression is mRNA analysis, such as quantitative PCR (qPCR). The application also describes a kit containing primers for these specific genes to facilitate their detection. The equine training market is $3.3 billion with a CAGR of 5.9%.
License: In negotiations

12. **U.S. Patent Application Number:** 19/094,074
UKRFID: 2786
Filed: March 28, 2025
Title: HIGH AND MULTIPLE REDOX POTENTIAL, STABLE, AND SOLUBLE BIS-DIARYLAMINE DERIVATIVES AND USES THEREOF
Inventors: Chad Risko, Hussein Hijazi, (College of Arts and Sciences) Aman Kaur and Susan Odom (formerly College of Arts and Sciences)
Description and Application: The invention includes novel bis-diarylamine derivatives designed for use as redox-active materials in non-aqueous redox flow batteries (RFBs). These compounds exhibit high and multiple redox potentials, enhanced stability in both neutral and charged states, and improved solubility in organic solvents like acetonitrile compared to existing organic RFB materials. The molecular structures, incorporating specific functional groups like methoxy and

trifluoromethyl, and different aryl bridges, are shown to influence the electrochemical properties and solubility. Electrochemical characterization and stability testing, including use in a symmetric flow cell, demonstrate the potential of these bis-diarylamine derivatives as promising catholytes for next-generation RFBs with improved energy density and long-term cycling performance. The design principles highlight the importance of molecular modification for achieving desirable properties in organic RFB materials. The global RFB market is expected to reach $1 billion by 2030 with a CAGR of 12.8%.
License: N/A

13. **International Application Number:** PCT/US2025/10255
UKRFID: 2842
Filed: January 3, 2025
Title: USE OF 5-HYDROXYTRYPTOPHAN TO ALLEVIATE SYMPTOMS OF FESCUE TOXICOSIS IN BEEF CATTLE
Inventors: David Harmon (College of Agriculture, Food and Environment), Eriton Valente (State University of Western Parana) and James Klotz (USDA)
Description and Application: The invention is a method for alleviating the symptoms of fescue toxicosis in beef cattle by administering 5-hydroxytryptophan (5-HTP). Fescue toxicosis is caused by the ingestion of ergot alkaloids from endophyte-infected tall fescue, leading to various physiological dysfunctions, including reduced feed intake and decreased circulating serotonin levels. The administration of 5-HTP, a precursor to serotonin that can cross the blood-brain barrier, can counteract the ergot alkaloid-induced serotonin suppression. The global animal additive feed market is expected to reach $55 billion with a CAGR of 4.3%.
License: N/A

14. **International Application Number:** PCT/US2025/12244
UKRFID: 2817
Filed: January 18, 2025
Title: METHODS FOR DETECTION, DIAGNOSIS, PROGNOSIS, TREATMENT, AND VISUALIZATION OF PERIODONTAL DISEASE OR RISK THEREOF
Inventors: Craig Miller, Jeffrey Ebersole, (College of Medicine) and Xiaohua Zhang (College of Public Health)
Description and Application: The invention include methods for detecting, diagnosing, prognosing, treating and visualizing periodontal disease or the risk thereof by analyzing oral fluid samples for specific biomarkers. The technology identifies a panel of biomolecules (proteins like Resistin, Interleukins, Matrix Metalloproteinases, etc.) and bacteria (including Dialister invisus, Fretibacterium fastidiosum, Fusobacterium nucleatum, Porphyromonas gingivalis, Treponema denticola, and others), as well as ratios of these biomarkers, that exhibit altered levels in subjects with periodontal disease compared to healthy individuals. By detecting these changes, the methods aim to provide earlier and more accurate diagnosis, assess disease progression, guide treatment strategies (such as antimicrobials, cleaning or therapeutic mouthwash), monitor treatment effectiveness, and offer visual representations of a subject's periodontal health

status or risk. This approach moves beyond traditional clinical and radiographic assessments by utilizing molecular and microbial markers found in oral fluid. The global periodontal disease treatment market is expected to reach $3.6 billion by 2030 with a CAGR of 5.9%.
License: N/A

15. **International Application Number:** PCT/US2025/15575
UKRFID: 2829
Filed: February 12, 2025
Title: CHARGE DOMAIN COMPUTING INSIDE DYNAMIC RANDOM ACCESS MEMORY
Inventors: Ishan Thakkar (College of Engineering)
Description and Application: The invention includes systems and methods to efficiently convert stochastic numbers to binary numbers directly within the Dynamic Random Access Memory (DRAM) for in-DRAM deep learning applications. The disclosed Analog-to-Unary-to-Binary In-situ (AGNI) conversion substrate repurposes existing DRAM peripherals and introduces new, area-efficient components to perform this conversion in four stages: DRAM row activation, stochastic-to-analog conversion via charge sharing, analog-to-transition-coded unary conversion using sense amplifiers as comparators, and unary-to-binary conversion using encoders. By performing this conversion in memory, AGNI aims to overcome the latency and energy overhead associated with traditional stochastic-to-binary conversion methods, thereby enhancing the performance of DRAM-based processing-in-memory architectures for accelerating convolutional neural networks. This approach promises a constant conversion latency regardless of the input/output number precision, offering a significant advantage over prior art. The in-memory computing global market is expected to reach $24 billion by 2030 with a CAGR of 16.5%.
License: N/A

16. **International Application Number:** PCT/US2025/16617
UKRFID: 2790
Filed: February 20, 2025
Title: INCREASING EXTRACORPOREAL FILTRATION EFFICIENCY OF BLOOD USING FEATURE INDUCED FLUID ROTATION
Inventors: Christine Trinkle (College of Engineering)
Description and Application: The invention is a novel blood filtration and oxygenation device that enhances efficiency by inducing fluid rotation within its channels. The device incorporates patterned surface features on the internal walls of microfluidic channels to create a rotational flow of blood. This rotation continuously mixes the blood, moving filtered/oxygenated blood away from the gas-permeable membrane and bringing unfiltered/deoxygenated blood into closer contact. This approach aims to overcome limitations of traditional extracorporeal membrane oxygenation (ECMO) and dialysis systems, such as blood stagnation, clot formation, high shear stress and high fluidic resistance. By promoting efficient mass transfer (oxygen/carbon dioxide or solute exchange) with a lower pressure requirement and potentially reduced thrombogenic surfaces, this technology seeks to improve the safety and longevity of extracorporeal blood treatment. The global

renal dialysis market is expected to reach $1.78 billion by 2030 with a CAGR of 7.4%.
License: N/A

17. **International Application Number:** PCT/US2025/17914
UKRFID: 2831
Filed: February 28, 2025
Title: STOCHASTIC COMPUTING ENABLED OPTICAL HARDWARE ARCHITECTURES FOR ENERGY-EFFICIENT AND SCALABLE ACCELERATION OF DEEP NEURAL NETWORKS
Inventors: Ishan Thakkar, Sairam Sri Vatsavai and Venkata Sai Praneeth Karempudi (College of Engineering)
Description and Application: The invention is a novel stochastic optical computing architecture designed for efficient and reconfigurable logic operations and accumulation, particularly to accelerate artificial intelligence workloads. The architecture uses optical signals and represents values as stochastic bit streams, where logic operations like multiplication are performed using simple optical AND gates. A key component is a reconfigurable optical logic gate based on a single microring resonator, capable of performing different logic functions (AND, OR, XOR, and their complements) by tuning its resonance frequency. Furthermore, the architecture incorporates specialized photo-charge accumulation circuits to integrate the optical bit streams over time and convert them into electrical signals. This approach aims to overcome the precision and efficiency limitations of traditional analog and digital optical computing architectures by leveraging the properties of stochastic computing and reconfigurable optical logic. The global AI accelerator market is estimated to reach $120 billion by 2030.
License: N/A

18. **International Application Number:** PCT/US2025/20579
UKRFID: 2837
Filed: March 19, 2025
Title: MEMBRANE-SORBENT BASED TECHNOLOGY TO MITIGATE VOLATILE COMPOUND EMISSIONS FROM CARBON DIOXIDE CAPTURE PROCESSES
Inventors: Kunlei Liu, Jesse Thompson, Ayokunle Omosebi, (College of Engineering) and Heather Nikolic (formerly College of Engineering)
Description and Application: The invention is a membrane-sorbent based technology to mitigate volatile organic compound (VOC) emissions from carbon dioxide (CO_2) capture processes that use amine-based absorbents. The system integrates a VOC removal unit that treats the condensate stream generated from the stripper's overhead gaseous product. This unit employs a two-stage process. First, a degassing vessel with a membrane separates gaseous VOCs (like aldehydes, ketones and ammonia) from the condensate after a pressure reduction step. The separated gaseous VOCs can then be neutralized or potentially recovered and used. Second, the remaining condensate flows through an activated carbon bed to capture any dissolved VOCs before the cleaned condensate is returned to the amine absorbent loop, thereby reducing VOC emissions in the treated flue gas and preventing their accumulation within the CO_2

capture system. The global carbon capture and storage market is expected to reach $9.6 billion by 2029 with a CAGR of 16.6%.
License: In negotiations

19. **International Application Number:** PCT/US2025/21116
UKRFID: 2833
Filed: March 24, 2025
Title: DISTRIBUTED DIRECT AIR CARBON CAPTURE IN CONJUNCTION WITH CENTRALIZED SOLVENT REGENERATION
Inventors: Kunlei Liu, Xin Gao, Ayokunle Omosebi, (College of Engineering) and Heather Nikolic (formerly College of Engineering)
Description and Application: The invention is a distributed direct air carbon capture (DAC) system using a centralized solvent regeneration unit. The system employs air contactors, which can be modular and located remotely, to capture CO_2 from untreated air using an alkaline solvent. The resulting CO_2-rich solvent is then transported to a carbonate electrolyzer. This electrolyzer uses pH swings induced by electrolysis to release the captured CO_2, generating CO_2 and oxygen at the anode and hydrogen and regenerated CO_2-lean solvent at the cathode. This centralized regeneration approach offers potential advantages such as the production of valuable hydrogen as a byproduct and the elimination of heat-intensive regeneration steps, while the distributed capture allows for flexible deployment of air contactors based on availability and scale. The global air carbon capture market is expected to reach $4.7 billion by 2032 with a CAGR of 40%.
License: In negotiations

Patent Activities
Fiscal Year to Date as of March 31, 2025

	Total FY2024-25				
	FY25Q1	FY25Q2	FY25Q3	FY25Q4	Total FY25
Invention Disclosures[i]	22	30[1]	36	0	88
Full Patent Applications[ii]	15	7	19	0	41
Provisional Patent Applications[iii]	27	17	23	0	67
Patents Issued	9	28[2]	14	0	51
License Income	$427,185.01	$572,731.30	$905.054.77	$0	$1,950,915.08[3]
New Licenses and Options Executed	29	15[4]	24	0	68
New UK Startups Formed	1	0	0	0	1

[1] Capture of disclosure originally entered with an incorrect disclosure date.
[2] Capture of licensee foreign issuances and validations.
[3] Incudes an additional $45,952.00 from Estate Whiskey Alliance membership fees that include a trademark license.
[4] Corrected an incorrect execution date on a license agreement.

Patent Activities
FY2023-24

Total FY2023-24					
	FY24Q1	FY24Q2	FY24Q3	FY24Q4	Total FY24
Invention Disclosures	24	34	49	35	142
Full Patent Applications	22	16	14	20	72
Provisional Patent Applications	18	15	25	20	78
Patents Issued	11	13	8	11	43
License Income	$446,360.22	$3,380,740.08	$332,705.97	$186,954.53	$4,346,760.80
New Licenses and Options Executed	13	17	14	22	66
New UK Startups Formed	2	3	0	2	7

Patent Application Summary Table

Inventors	College(s)	Title	Brief description
Biomedical			
Vincent Venditto, Abdullah Masud, David Nardo and Julian Mory	College of Pharmacy	Triazine lipids, lipid synthesis, and methods for inhibiting canonical NF_kB transcriptional activity	A novel triazine lipid for vaccine production.
Sylvie Garneau-Tsodikova	College of Pharmacy	Thiol isomerases inhibitors; preparation thereof; and methods of use thereof	Novel thiol isomerase inhibitors for cancer treatment.
Elie Abu Jawdeh	College of Medicine	Systems and methods for predicting extubation readiness	A novel method to predict extubation readiness of preterm infants.
Craig Miller, Jeffrey Ebersole and Xiaohua Zhang	College of Medicine	Methods for detection, diagnosis, prognosis, treatment, and visualization of periodontal disease or risk thereof	A novel method to detect and treat periodontal disease.
Engineering			
Sridhar Sunderam and Madison Bates	College of Engineering	Wearable sensor-based device	A novel wearable device to facilitate stroke rehabilitation.

Inventors	College(s)	Title	Brief description
Joshua Werner and Lucas Bertucci	College of Engineering	Extraction of copper and other elements from waste materials for the production of metallic copper	A novel method to recover copper and other valuable metals from waste materials.
Kunlei Liu, Jesse Thompson, Ayokunle Omosebi, Leland Wigder, Daniel Moreno and James Landon	College of Engineering	Apparatus and method for production of formate from carbon dioxide	A novel method for enzymatic production of formate.
Ramkumar Annamalai and Tyler Barzee	College of Engineering	A bottom-up approach for sustainable cultivated meat production	A novel approach to 3D print meat.
Mark Suckow and Noe Tirado-Muniz	College of Engineering	A surgery platform with a rotating surface on a stationary base with integrated gas lines, integrated heating elements, and leg positioning strap system	A novel surgical platform for small vertebrates.

Inventors	College(s)	Title	Brief description
Jian Shi, Xin Gao, Yuxuan Zhang, Qing Shao and Ahmed Ullah and Ning Wei	College of Engineering	A method for synthesis of cathode materials from black mass	A novel method to recycle spent lithium-ion batteries.
Ishan Thakkar	College of Engineering	Charge domain computing inside dynamic random access memory	A novel system to convert stochastic numbers to binary numbers directly in DRAM.
Christine Trinkle	College of Engineering	Increasing extracorporeal filtration efficiency of blood using feature induced fluid rotation	A novel blood filtration and oxygenation device.
Ishan Thakkar, Sairam Sri, and Venkata Sai Praneeth Karempudi	College of Engineering	Stochastic computing enabled optical hardware architectures for energy-efficient and scalable acceleration of deep neural networks	A novel optical computing architecture to accelerate artificial intelligence workloads.
Kunlei Liu, Jesse Thompson, Ayokunle Omosebi and Heather Nikolic	College of Engineering	Membrane-sorbent based technology to mitigate volatile compound emissions from carbon dioxide capture processes	A novel membrane-sorbent to mitigate volatile organic compound emissions.

Inventors	College(s)	Title	Brief description
Kunlei Liu, Xin Gao, Ayokunle Omosebi and Heather Nikolic	College of Engineering	Distributed direct air carbon capture in conjunction with centralized solvent regeneration	A novel direct air capture system using a centralized solvent regeneration unit.
College of Arts and Sciences			
Aman Kaur, Chad Risko, Hussein Hijazi and Susan Odom	College of Engineering	High and multiple redox potential, stable, and soluble bis-diarylamine derivatives and uses thereof	Novel materials to produce redox-flow batteries.
College of Agriculture, Food and Environment			
Pradeep Kachroo, Aardra Kachroo, Gah-Hyun Lim and Shine Baby	CAFE	Use of non-coding nucleic acid for crop improvement and protection against microbes	Novel compounds for conferring systemic acquired resistance (SAR) in plants.
Allen Page, James Macleod, David Horohov, Theodore Kalbfleisch and Emma Adams	CAFE	Detection of expression of markers useful for predicting risk of catastrophic injuries in athletic animals	A novel method to predict risk of catastrophic injuries in athletic animals.
Inventors	**College(s)**	**Title**	**Brief description**
David Harmon	CAFE	Use of 5-hydroxytryptophan to alleviate symptoms of fescue toxicosis in beef cattle	A method to alleviate symptoms of fescue toxicosis in beef cattle.

[i] Invention disclosures include new technologies and intellectual property disclosed to Technology Commercialization (TC) that do not fall under an existing technology number. This number captures the potential new intellectual property disclosed to TC.

[ii] Full patent applications, as used by TC, include nonprovisional patent application filings at the United States Patent and Trademark Office (USPTO), Patent Cooperation Treaty filings, and foreign patent application filings. These are technologies that are assigned to the University of Kentucky that TC has identified to invest further into in an effort to obtain patent protection and are described in more detail in the patent assignment section above.

[iii] Provisional patent applications are legal documents filed at the USPTO that establish a filing date and protect the owner from anticipated publication of the technology, but do not mature into an issued patent unless the applicant files a full patent application within one year. Although owned by the University of Kentucky, the provisional patent applications are not included in the patent assignment descriptions as they will not mature into full patent applications without further action and investment.