

ANNUAL REPORT | FY2019

T O M O R R O W I S
— HERE —



**TECH LAUNCH
ARIZONA**

OUR PURPOSE: Bringing together the University community and local and regional ecosystems, we're **making a better world** by moving inventions stemming from UArizona research into the marketplace where they can create lasting social and economic impact.

UNIVERSITY OF ARIZONA CORE VALUES

INTEGRITY:

Be honest, respectful, and just.

ADAPTATION:

Be open-minded and eager for what's next.

EXPLORATION:

Be insatiably curious.

INCLUSION:

Harness the power of diversity.

DETERMINATION:

Bear Down.

COMPASSION:

Choose to care.

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A TEAM TO MAKE IT HAPPEN

IT'S HAPPENING HERE.

At Tech Launch Arizona we have a motto that drives every team member every day: #MakeItHappen. We pride ourselves on carrying out our responsibilities with **integrity** – maintaining transparency and honesty in all our interactions. We see the **inclusion** of a diverse and collaborative team as an essential ingredient in creating a workplace where everyone can thrive. We are constantly evaluating our methods and processes to **adapt** to an ever-changing world, **exploring** more effective and creative ways to gain efficiencies, reach our goals and address challenges with open minds. We are **determined** to be the best at what we do, enhancing the impact of Arizona research and intellectual property, and will overcome any and all obstacles in our path. Through it all, we keep **compassion** in the forefront, working with internal and external customers to understand their goals and concerns, and arrive at mutually advantageous solutions.



ROBERT C. ROBBINS, PRESIDENT OF THE UNIVERSITY

I am proud that Tech Launch Arizona is a vital part of our vision for the University of Arizona, and for our potential as a world leader in the Fourth Industrial Revolution. As a public land-grant, AAU university, we are uniquely well-positioned to address grand challenges faced by people all over the world, and TLA's success this year demonstrates that our solutions-oriented culture and strategic investments are producing results. Our strategy emphasizes areas where the University of Arizona can maximize

our impact here in Tucson, in Arizona, and around the world. Building on our strengths, we are leading the world to address grand challenges at the edges of human endeavor and capability, with focal points like space sciences and technology; creating healthier communities; the aging brain; data, network, and computer sciences; humanics, the intersection of technology and human engagement; and creating a sustainable future Earth. The new inventions in our commercialization pipeline and companies launched through TLA

this year are just a few examples of the way University innovations spur economic development and benefit the people in our state.

Tech Launch Arizona is the mechanism to translate the groundbreaking research happening here at Arizona into products, services, and companies that reach people all over the world. It is a major source for the University's impact, and I am grateful to Doug Hockstad for his leadership as we work toward creating a bold and bright future.

"UAVenture Capital has made 13 investments in UArizona technology startups. TLA has been a huge resource to us, not only in deal sourcing but in the preparation of faculty inventors to interact with venture capital. The strength of TLA patent protection has helped create unparalleled technology in a variety of fields."

—Fletcher McCusker,
CEO, UAVenture Capital

WELCOME



DOUGLAS HOCKSTAD ASSISTANT VICE PRESIDENT, TECH LAUNCH ARIZONA

I'll begin our annual report with a little explanation about the theme, "Tomorrow is here." There's so much encapsulated in these three words, it's worth peeling back the onion a bit to give us context.

In one sense, the phrase refers to this place, the University of Arizona. In this place at this time, people across the UArizona ecosystem are working to solve problems and develop solutions that can make a better world, improving and even saving lives. We are honored to be working with these inventors, as well as our extended network of experts, to bring these technologies out into the world.

At the same time, these words are a reminder that we have a unique opportunity—and responsibility—to ensure that these inventions, these steps toward a better tomorrow, get out into the world.

With this theme as our touchstone, we are continuing to focus our programs on delivering on our mission and growing the impact of the inventive minds of the UA, from increasing the number of inventions flowing into the marketplace to creating more opportunities for startups to helping more teams pursue their entrepreneurial dreams.

It has been a transitional year for us. We have had a number of employees leave us to retire or seek new opportunities, and at the same time, have been fortunate to hire new talent with an impressive library of experiences to bring to the table. Through all the change, we have continued our steady rise amongst our peers, and kept our focus on sustainable levels of output and growth, and high-quality outcomes for all of our clients.

Looking ahead, we will continue to innovate and develop new strategies for impact. In FY2020, we are excited to welcome Betsy

DR. ELIZABETH CANTWELL SR. VICE PRESIDENT OF RESEARCH & INNOVATION

Cantwell, the incoming Senior Vice President of Research and Innovation, who oversees our office, as well as Research, Tech Parks Arizona and Arizona Forge. Being a part of this pantheon, I am excited about the incredible potential for growth and impact in the coming years.

As a new arrival on the UArizona research scene, I'm especially excited to be working with Tech Launch Arizona, where our brightest minds are putting their best breakthroughs to work for a better future.

Every day, our faculty, researchers and graduate students make discoveries and invent new technologies. In FY2019 alone, UArizona inventors reported 284 innovative ideas, from 3D printed contact lenses to new tech for cleaning up ocean-polluting plastics. Collectively, these innovations make up a sweeping portfolio of intellectual property. TLA takes on the responsibility and privilege of

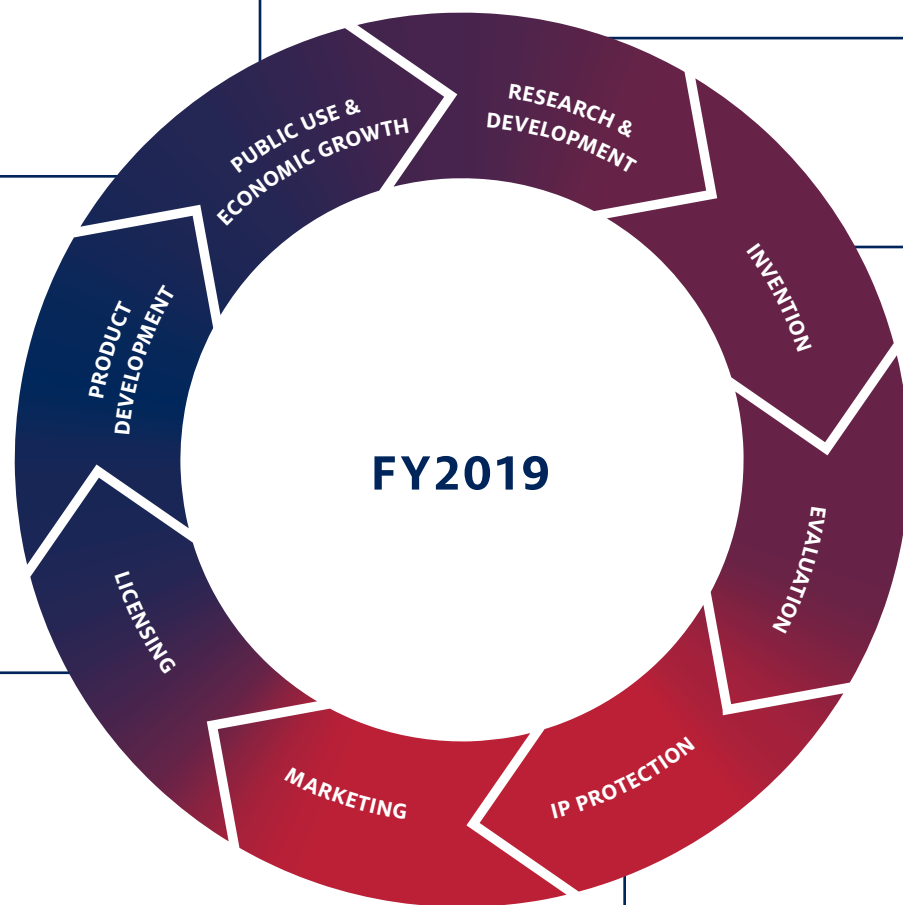
ensuring these assets are protected and, when feasible, moved into commercial and social applications where they can do the greatest good. This vitally important work is in line with the University of Arizona's mission as a land grant university.

I'm looking forward to learning about and sharing many thrilling discoveries as part of the UArizona research community. And I'm so proud to support the dedicated people at TLA who help breakthrough ideas find real and lasting impact, launching tomorrow's solutions from today's academic classrooms and labs.

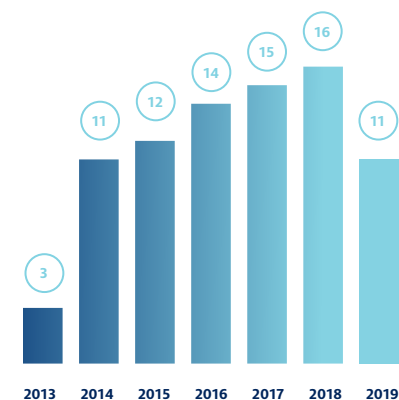
BY THE NUMBERS

Every year, UArizona research yields inventions with commercial potential. TLA shepherds ideas from the lab to the marketplace – from evaluating and protecting discoveries to commercializing the inventions through new and existing companies.

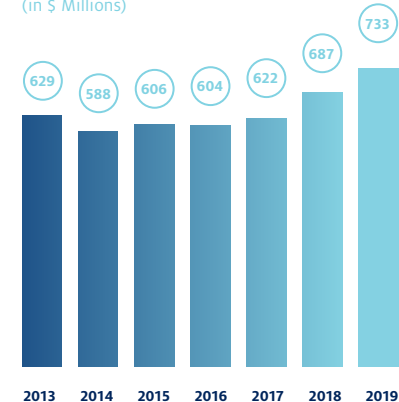
TECHNOLOGY COMMERCIALIZATION CYCLE



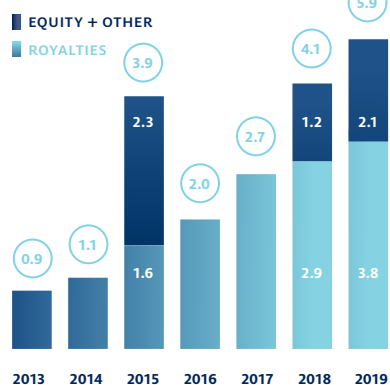
11 STARTUPS FORMED



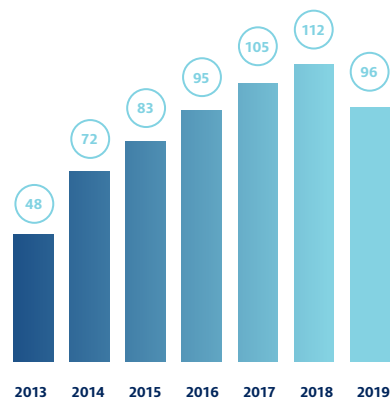
\$733M RESEARCH EXPENDITURES (in \$ Millions)



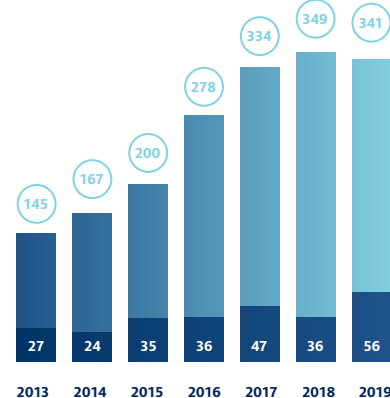
\$5.9M OF ROYALTIES & OTHER INCOME (in \$ millions)



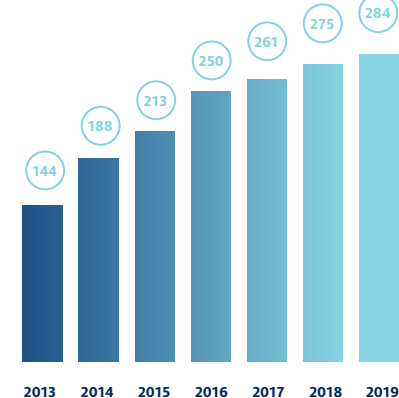
96 LICENSES & OPTIONS



56 PATENTS ISSUED 341 PATENTS FILED

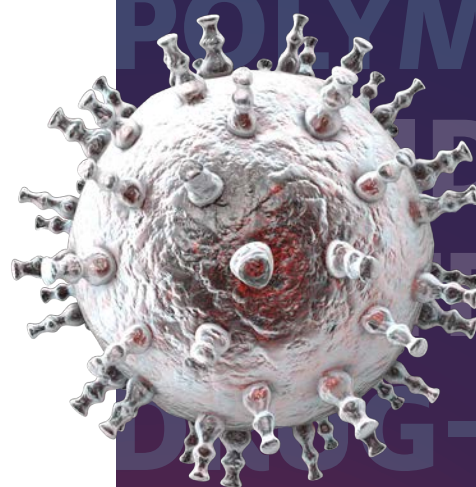


284 INVENTION DISCLOSURES



284 INVENTIONS

In FY2019, UArizona inventors brought forward these 284 innovative ideas for a better world.



284 INVENTIONS THAT HAVE THE POTENTIAL TO CHANGE THE WORLD

SPACE EXPLORATION & OPTICAL SOLUTIONS

- A Fast Compression Algorithm for Images and Video Capable of Real-Time Speed
- A Low-Cost Agricultural Solar Bioreactor Module
- Aberration Correction in Volume Holographic Optical Elements Using Spatial Light Modulator Computer Generated Holograms
- Amplified Deformable Mirror (ADM)
- Aperture Designs to Minimize Diffraction Noise
- ASLM Multi-Display
- Assembly of Flexible Optical Waveguides and Photonic Chips for Optical Interconnection Packaging
- Bifacial Spectrum Splitting Photovoltaic Module
- Blown Float Glass Lens Array and Method
- Cell Collection Device for Biological Analysis
- Center for Astronomical Adaptive Optics' Adaptive Secondary Controller (CASC)
- Chip-to-Chip Optical Interconnection Between Polymer Waveguides and Ion-Exchanged Glass Waveguides Using High Refractive Index Couplers
- Close-Range PET
- Compact High Dynamic Range HMD with Single Pass Relay
- Complex Diversity for Inverse Problems
- Curved Combiner
- Dual-Axis Tracker Using Lightweight Spaceframe Structures
- Educational Content for Online Courses
- Efficient All-Fiber Amplifier Based on Small Diameter Air Clad Fibers
- Entanglement Assisted Distributed Radars
- Fast Gamma-Ray Interaction-Position Estimation
- Fast Volumetric Imaging of Fluorescent Tissue Structures and Activities
- Gradient Index Microlens - Method and Devices
- Grating Arrangement for Confocal Microscope
- Heterogeneously Integrated Saturable Absorber in a Photonic Integrated Circuit: Methods and Designs
- High-Resolution and High-Throughput Additive Manufacturing
- High-Speed Confocal Microscope
- Holographic Elements for Augmented Reality Headware
- Hybrid 3D Optics Printing
- Hybrid Pyramid-Shack-Hartmann Wavefront Sensor
- Induction Heating for Forming High-Precision Metal Panels
- Integrated Frequency Locked Optical Whispering Evanescent Resonator (FLOWER) Based on Raspberry Pi
- Integrated Lander Chassis for CubeSats
- Kinematically Engaged Yoke System
- Laser Beam for External Position Control and Traffic Management of On-Orbit Satellites
- Low-Tension Tether System to Constrain Satellite Clusters and Permit High Bandwidth Communications
- Material Shape Change Using LIRIC
- MEMS-Based Hybrid Beam Steering for LIDAR
- Method for the Efficient Generation of High Order Hermite Gaussian (HG) Modes in a Laser Cavity
- Method of Doping Glasses with Nanoparticles
- Method to Operate a Single-Frequency External-Cavity Diode Laser
- Methods and Apparatus for Confocal Endoscopes
- Microcavity Surface Bioconjugation Using Unilamellar Lipid Membranes for Label-Free, Ultrasensitive Detection of Alzheimer's Biomarkers
- Mobile Confocal Microscope
- Mode Scrambler for Increasing Numerical Aperture
- Multiplexed Computed Tomography X-ray Imaging
- Nanosatellite Based Low-Cost Laser Communications Network for Low-Earth Orbit
- Novel Polymers for Mid- and Long-Wave Infrared Imaging
- On-Chip Magnetometer
- On-Chip CMOS Threshold Processing
- Open Loop Pointing Technique for Orbital Laser Communications
- Optical Design Methods for Head-Mounted 3D Light Field Displays
- Optical Gyroscopes with Gain Medium and Circulating Light
- Optomechanical Inertial Reference For Atom Interferometers
- Oral and Oropharyngeal Cancer Screening System and Methods of Use
- Phase Unwrapping by Neural Network
- Photonic Quantum Computing Using Entangled Squeezed State Clusters
- Polarization Phase Transition Computing Architecture
- Polarization State Scrambler Using Birefringent Phase Mask
- Polishing Interface Coating Technology
- Polychromatic Rayleigh Laser Guide Star
- Pseudo-Nulling Mach-Zehnder Metrology
- Quantitative Large Area Binding Sensor for Detecting Biomarkers
- Saturable Absorbing Fiber for Mass Production of Robust Mode-Locked Fiber Lasers
- Scattering-Based Light Sheet Microscope
- Silicone Aspherical Lens Array for Concentrating Solar Applications
- Silicone Waveguide for Solar Applications with High Concentration
- Smartphone-Based Epifluorescence Microscope
- Snapshot Mueller Matrix Polarimeter
- System and Method for Rapid Prototyping of 3D Heterogeneous Nanostructures
- Tactical Lighting Device
- Throttling, Descent and Landing of a Projectile Using Spin-Stabilization and Torque-Free Precession
- Trapezoidal Shim for Segmented Optics Assembly
- Using Machine Learning to Create High-Efficiency Optical Design Tools
- Virtual Deflectometry Enclosure Screen
- White Light Interferometry Imager

IMPROVING HEALTH

- 3D Printed Lens for Imaging in Falloposcope
- A "Mechanical Conditioning" Multi-Gene Score for Prediction and Intervention of Breast Cancer Bone Metastasis
- A CEACAM6 Immunomodulatory Antibody Targets Pancreatic Cancer
- A Molecular Diagnostic Tool for Detecting Clostridium Difficile Infection, Carriage and Outbreaks
- A New Method for Preventing and/or Treating Asthma and Related Respiratory Conditions
- A Peptide Approach to Block eNOS Phosphorylation at T495
- A Series of Novel Autophagy Inhibitors
- Affinity Peptide Conjugated with Antioxidant for Protection of Proteins from Oxidation
- Agents, Compositions and Methods for Treating and Preventing Alzheimer's Disease
- An Efficient and Improved Chemical Conversion of the Natural Product Physachenolide D (LG-01) to Its Analogue LG-134 with Potent Anticancer Activity
- An Implantable Miniaturized and Soft Wireless Sensor to Monitor Tissue and Bone Deformation
- Antibody-Drug-Grafted Immune Cells
- Antimicrobial and Antiviral Therapy in Shrimp Using Genome Editing
- Antimicrobial and Antiviral Therapy in Shrimp Using Genome Editing II
- Artificial Membranes Incorporating GPCRs for Label-Free, Electrophysiological Measurements of Ligand- GPCR Interactions
- Barn Dust Extract
- Baro-Balloon
- Beta-Adrenergic Receptor Activation to Increase the Potency and Safety of Peripheral Blood Stem Cell Grafts
- Biomarker for Heart Failure and Other Related Diseases
- Blood-Based Inflammatory Biomarkers and Predicting Allopregnanolone Therapeutic Response
- Broad Spectrum Antivirals Against Enterovirus D68, A71, and Coxsackievirus B3
- Cognitive Assessment Using Upper-extremity Motor Function
- Conjugation of the MCR1 Ligand with Cytotoxic Drugs for Targeted Melanoma Therapy
- CSFR Inhibitor in Treatment of Tinnitus, Hearing Loss, Hyperacusis, Central Auditory Processing Deficit
- Design and Application of New Split-Luciferase Enzymes
- Development of Aptamers Neutralizing Antibodies for Demyelinating Diseases
- Diagnostic Analyte to Enrich LINE-1 and Detect LINE-1 Driven Oncologic Disease
- Diagnostic for predicting Women "At Risk" for Poor Gynecologic Health Outcomes
- DOJO
- Draft Genome Assembly of the Entomopathogenic Bacterium Photorhabdus Luminescens Subsp. Sonorensis
- Essential Oil Microemulsions and Plant Extracts to Prevent Biofilm Formation
- Five Module Chimeric Antigen Receptors (5M CARs)
- Flame Retardant Additives from Chalcogenide Hybrid Inorganic/Organic Polymers
- Focal Adhesion Kinase (FAK) as a Prognostic Immunohistochemical Marker in Early Stage Cancer
- Fragment-Based Inhibitors of the Focal Adhesion Targeting (FAT) Domain of Focal Adhesion Kinase (FAK)
- G-quadruplex Targeting Small Molecules for the Treatment of Castration Resistant Prostate Cancer and HSV-1
- Gall Bladder Cryoablation Device
- Gallstone Dissolving Solution and Method; Gallbladder Chemical Ablation Solution and Method
- Genetic Markers for Resistance Against Acute Hepatopancreatic Necrosis Disease (AHPND) in Shrimp
- Genetic Rat Model for Pulmonary Hypertension
- Glycosylated Oxytocin Analogues for Non-Opioid Pain Relief and/or Addiction Treatment
- Hot Swappable Brain Implant
- Improved Properties and Synthesis of NanoSPA Particles
- Increasing 3HAA for Improving Response to and Recovery from Sepsis
- Inhibitors of the DNA - KU70/80 Association to Sensitize Cells for Radiation or Chemotherapy
- New Strategies to Block RIPK1/ RIPK3-Mediated Neurodegeneration
- Noninvasive Method of Treatment of Bone Fracture Using Carbon Fiber Reinforcement
- Leukocyte RNA Expression: A Novel Neurosurgical Genomics Technique for Predicting Seizure-Free Outcome following Stereotactic Laser Amygdalohippocampotomy
- Lipid Biomarkers for Cancer Screening and Monitoring
- Liquid Biopsy for Cancer Using DNA Methylation Markers
- Measuring Edema and Body Composition in Heart Failure Using EchoMRI
- Method for Improving Homology-Directed Repair Using the Adapted-Type II CRISPR-Cas System
- Methods and Apparatus Suitable for Interrogating Biological Systems: Tumor-on-Chip
- Methods and Compounds to Treat and Prevent Macular Degeneration Through Restoration of Daily Rhythm of Specific Retinal Pigment Epithelium Function
- Methods for Building a Self-Contained Responsive Biological System
- Methods, Compounds, and Compositions for the Treatment of Neurodegenerative Diseases
- Modeling Pontocerebellar Hypoplasia Type 1B (PCH1B) Using a Chemical Biology Approach
- Modulation of Transient Receptor Potential Vanilloid-1 (TRPV-1) for the Maintenance of Ocular Surface Homeostasis
- Molecular Imaging for High-Risk Carotid Plaques
- Natural Compounds to Treat Alzheimer's Diseases
- Natural Language Processing and Deep Learning for Analysis of DNA Sequences
- Navigation Aids for the Visually Impaired
- Nematocidal Activity of Three Secondary Metabolites Produced by the Entomopathogenic Bacterium Photorhabdus I. Sonorensis
- Neurological Disease and Injury Biomarker
- Novel Advanced Formulations of Cyanidin for Respiratory Diseases
- New Libraries of Disulfide Prochelators and Application of Treating Metal Ion Dysregulation
- New Strategies to Block RIPK1/ RIPK3-Mediated Neurodegeneration
- Noninvasive Method of Treatment of Bone Fracture Using Carbon Fiber Reinforcement

- Novel 5-Fluorouracil Prodrug for Colorectal Cancer Therapy
- Novel Compounds that Selectively Inhibit HSP70 Isoforms for the Treatment of Cancer
- Novel Conditional Knockout Model Of ER-Alpha in Rats
- Novel Conditional Knockout Model Of ER-Beta in Rats
- Novel Conditional Knockout Models of ER-Alpha and ER-Beta in Rat Brains
- Novel Forebrain Neuron Specific CreERT2 Rat Model
- Novel Knockout Model of ER-Alpha in Rat Neurons
- Novel Knockout Model of ER-Beta in Rat Neurons
- Novel Liquid Formulations of Sirolimus for Localized Delivery in the Prevention of Graft Rejection
- Novel Peptidic Inhibitors of Focal Adhesion Kinase (FAK) Non-Catalytic Function
- Novel Treatment for Nonalcoholic Fatty Liver Disease
- Nudel Serine Protease as a Target for Mosquito Vector Control
- Nutraceutical Formula for Alzheimer's and other Neurodegenerative Diseases
- Ozone in Combination with Essential Oil Microemulsions as Antimicrobial Sanitizers for Produce
- Patient-Derived Established Pancreatic Neuroendocrine Cell Culture System
- Peer Support Software to Support First Responders
- Perfusion System for Automatic Cell Culture
- Polyethyleneglycol Coated Shells for NanoSPA
- Re-Formulation and Local Drug Delivery Methods of TNF-Alpha Inhibitors to Treat Tinnitus
- Repurposed FDA-Approved Drugs as an Optical Biopsy Stain Panel
- Repurposing of an FDA Approved Drug (Telaprevir) for Treatment of Enterovirus D68
- Size-Conforming PET Scanner
- Smart Box for Health Logistics
- SP-A Peptide Mimetics in the Treatment of Inflammatory Lung Diseases
- Sucrose-Derived Scaffold for Gd MRI Contrast Agent and Method for Use in Colon Cancer Screening
- Superior Infiltration Bioreactor for Scaffolds
- Targeting Mitochondrial Genetic Variances as a Precision Medicine Opportunity for Alzheimer's Disease Therapies
- Targeting TDP-43 for Parkinson's Disease Therapy
- The FAMCON For Prediabetes Program
- The Mobile Vertical Farm (Go-Vertical Farm) for Automation of Vertical Farming Operations
- Tools and Techniques to Identify Antigen-Specific T Cells
- Transcriptional Regulatory Network Evolution Simulator
- Ultrasound-Guided Percutaneous Nephrostomy Model
- Universal Chimeric Antigen Receptors for T-cell Cancer Therapy
- Variable Solvent Polarity Chromatography
- Variable Stationary Phase Chromatography
- Vascular Plug
- Virtual Patient Assistant (VPA)
- Virtual Reality Simulation for Airway Management
- Wireless Battery Free Long-Range Wearable Recording Platform For Digital Acquisition of Chronic Biological Signals

WATER, ENVIRONMENTAL & ENERGY SOLUTIONS

- Automated Drone Date Pollination System
- Biocompatible Polymer for Fugitive Dust Control
- Biosphere 2 Augmented Reality App
- Continuous-Feed Solid-State Fermentation Module for Mushroom Production
- Control of Perovskite-Oxide Interfacial Defects
- Date Palm Tree Identification and Centering Method
- Date Palm Tree Pollen Dispenser Device
- Electrical Elicitation for Enhancement of Cell Growth and Production of Secondary Metabolites in Microalgae Cultures
- New Strategies to Block RIPK1/ RIPK3-Mediated Neurodegeneration
- Environmentally-Friendly Dust Suppressant Polymer Blend
- Glyonic Liquids for Use as Deep Eutectic Solvents
- Graphical User Interface for Drone on Date Palm Farm
- Grasshopper Harvester
- Machining a Solution to Data-Heavy Rangeland Research
- Metal Organic Framework with Multicyclic Carbocation Linkers
- Multicyclic Carbocation-Metal Coordinated Compounds for Artificial Photosynthesis Devices
- Nanoparticles for UV-Free Activation of Photochemical Reactions
- Passive, Solar, Large-Scale Drying System for Agricultural Waste
- Programmable Plants
- Rearing Mealworms on Beer and Vegetable Waste in A Self-Contained System
- Superconducting Glyonic Liquids
- The i-Abacus Green Box
- The i-Incline Green Box
- The i-Sprout Green Box

NATIONAL DEFENSE & SECURITY SYSTEMS

- 3D Printing Using Tholins or Other Extraterrestrial Polymers
- Autonomous Soft Robotic System
- Chalcogenide Hybrid Inorganic/Organic Polymers (CHIPs) Using Cyclic Olefinic Comonomers
- Energy Efficient Switching in Magnetic Tunnel Junctions with an Antiferromagnetic Barrier
- Low RCS Meta-Material for Radar Illuminator
- Inexpensive and Processable Polymer Magneto-Optic Nanoparticle Composites for Faraday Rotation: Plastic Garnet Optical Isolators and Sensors
- Making the Heat Generated in Hypersonic Flight Being Critically Utilized
- Optical Device Elements, Lenses, Windows via Diamond Turning of Chalcogenide Hybrid Inorganic/Organic Polymers (CHIPs)
- Sea Radar Camouflage
- System and Method for Aligning Diverse Human-Computer Interaction Data to Specific Fields on an Online Form
- System and Method for Generating a Risk and Intent Score Based on Navigation and Form Completion Behaviors Through Diverse Human-Computer Interaction Data
- Trackable Reasoning and Analysis for Crowdsourcing and Evaluation (TRACE)

OTHER

- 2018 Congressional District 3 Debate
- 3-D Printing of Glass Structures Using Laser Patterning of Precondensed, Liquid Silica and Organically Modified Silica Polymers
- A Method for Unsupervised Change Detection Using Deep Learning
- Arizona Illustrated Episode #107643: Terro! Dew Johnson
- Arizona Illustrated: Stealing Woman-Ochre
- Arizona Public Media News Department Photo
- Arizona's Dust Bowl: Lessons Lost
- Automated Conversion of Corrosion Current to Corrosion Rate
- Automotive Radar Interference Mitigation Using Adaptive Noise Canceller
- Bear Down Network App
- Constitutions Toolbox
- Creation or Optimization of NoC Routing Protocols and On-Processor Design
- Curriculum Materials for the Education of Graduate-Level Measurement Science
- Deep Learning for SVD and Hybrid Beamforming
- Discretized Gaussian Modulation (DGM)-Based Continuous Variable-QKD
- Distribution of Quantum Entanglement in an Underwater Environment
- Divine Mission: San Xavier del Bac
- Drone-Based LIDAR scanner
- Eliminating Deconvolution Artifacts with Softmax Function
- Enabling Search and Collaborative Assembly of Causal Interactions Extracted from Multilingual and Multi-Domain Free Text
- Entangled Quantum Sensor Network Enhanced by Practical Quantum Repeaters
- Entanglement-Enhanced Machine Learning
- Error Reconciliation Over Covert Channel
- FPGA-Based Rate-Adaptive Spatially-Coupled LDPC Codes for Optical Communications
- General Recipe for Designing Quantum Optimum Receiver Architectures Using Machine Learning
- Hardware Platform Enabling the Instruction of Analog Signal Processing Techniques at the Collegiate Level
- Hello Landlord
- Hybrid DV-CV QKD Outperforming Existing QKD Protocols
- In The Americas with David Yetman, Season 7
- Insecta: Science That Stings
- Mapping the Borderlands: Online Mixed Media and Geolocated Social Engagement Platform for Education
- Curriculum Materials for the Education of Graduate-Level Measurement Science
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- Drone-Based LIDAR scanner
- Eliminating Deconvolution Artifacts with Softmax Function
- Enabling Search and Collaborative Assembly of Causal Interactions Extracted from Multilingual and Multi-Domain Free Text
- Publication and Research Manager
- Probabilistically Coded Modulation Formats for 5G Mobile Fronthaul Networks
- Residency Interview Tracker
- Resident Evaluation System Application (RES App)
- Route Computing for Destination-Oriented Navigation
- Run-Time Reconfigurable Adaptive LDPC Coding for Optical and Wireless Communications
- Scientific Discovery as Link Prediction in Influence and Citation Graphs
- Scientific Keyboard Layout
- Silver-Silver Sulfide Reference Electrode
- Slepian-States-Based DV- and CV-QKD Schemes Suitable for Implementation in Integrated Optics
- Software Platform for the Collection and Processing of Chemical Data
- Swarms of Spacecraft for Flyby Exploration, Mapping and Resource Prospecting
- Systems and Methods for Detecting and Analyzing Response Bias
- Teachers' Voices
- Tetrazine Vulcanization Agent for Alkenyl-Modified Polymers
- The Five C's: A Century Later
- The Workplace We Want©
- Together We Heal
- Tomorrow Lab (Code of the Wild)
- Topological Acoustic Sensing
- Tucson Remembers: Pearl Harbor
- Tucson Remembers: The Battle for Europe
- Tucson Remembers: The Korean War
- Tucson Remembers: The War Years
- Tucson Remembers: War in the Pacific
- Winning by Living: One Cancer Story

MAKING IT HAPPEN



A NEW TREATMENT FOR FIBROSIS

CHALLENGE

Fibrotic disorders – the progressive buildup of scar tissue – are typically chronic and can often be fatal, causing 45 percent of deaths across the U.S. each year. As of today, there is no cure.

SOLUTION

A research team at the UArizona College of Medicine – Tucson and BIO5 Institute has been working diligently to understand the deeper workings of these diseases. Associate Professor of Medicine Louise Hecker, Senior Research Scientist Vijay Gokhale, and organic chemist Reena Chawla invented the first highly selective Nox4 small molecule inhibitors for the treatment of fibrotic disorders.

Fibronox was created to commercialize the invention.

“With hundreds of failed clinical trials for fibrotic disease, there is a clear need for improved therapeutic strategies. Nox4 is the major cellular source of oxidant generation, and a drug targeting Nox4 would shut down oxidant production to combat oxidative stress and stop the problem at the source.”

—Louise Hecker, PhD, Associate Professor of Medicine, Inventor

✓ GUIDANCE FROM MENTORS-IN-RESIDENCE

✓ RECIPIENTS OF ASSET DEVELOPMENT FUNDING

✓ I-CORPS PROGRAM GRADUATES

CONTROLLING DUST IN A DRY WORLD

CHALLENGE

People living in dry climates worldwide experience the problems wrought by dry air and blowing dust, which affects everything from respiratory health to cars and other machinery. To control dust in areas like mines and construction sites, the general practice is to spray the ground with water. While this method does keep dust levels down, sites require constant reapplication, especially in arid climates like Arizona.

SOLUTION

Researchers at the UArizona College of Engineering and the BIO5 Institute developed an environmentally safe biocompatible polymer blend that, when added to water used for dust control, keeps the ground damp for more than two months, even when exposed to the open desert air.

The technology was invented by Assistant Professor of Mining and Materials Engineering Minkyu Kim and Assistant Professor of Mining and Geological Engineering Kwangmin Kim. Working with TLA, Minkyu launched startup Clean Earth Tech to bring the solution to the world.

“Most of my work has been about finding new things and contributing to science. I’m very excited to know that my work is benefitting all of society, not just academia.”

—Minkyu Kim, Ph.D.
Assistant Professor of Mining and Materials Engineering

✓ GUIDANCE FROM MENTORS-IN-RESIDENCE

✓ RECIPIENTS OF ASSET DEVELOPMENT FUNDING

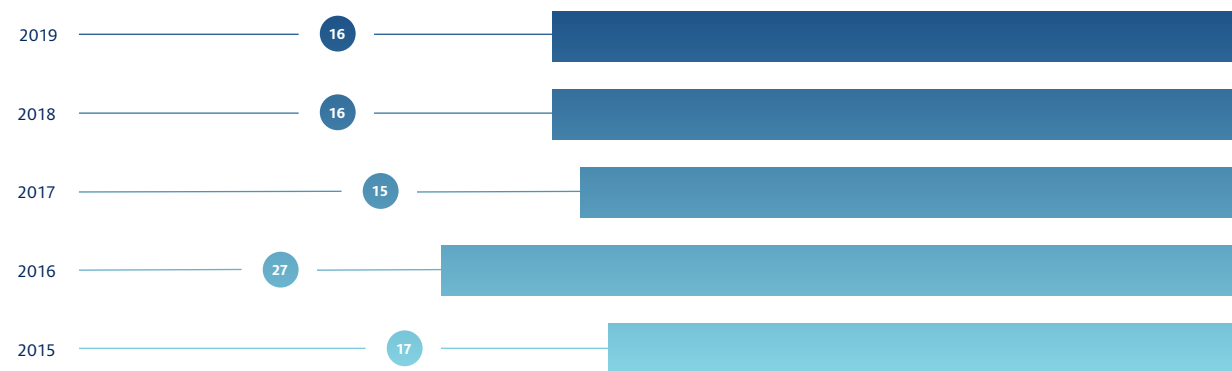
✓ I-CORPS PROGRAM GRADUATES



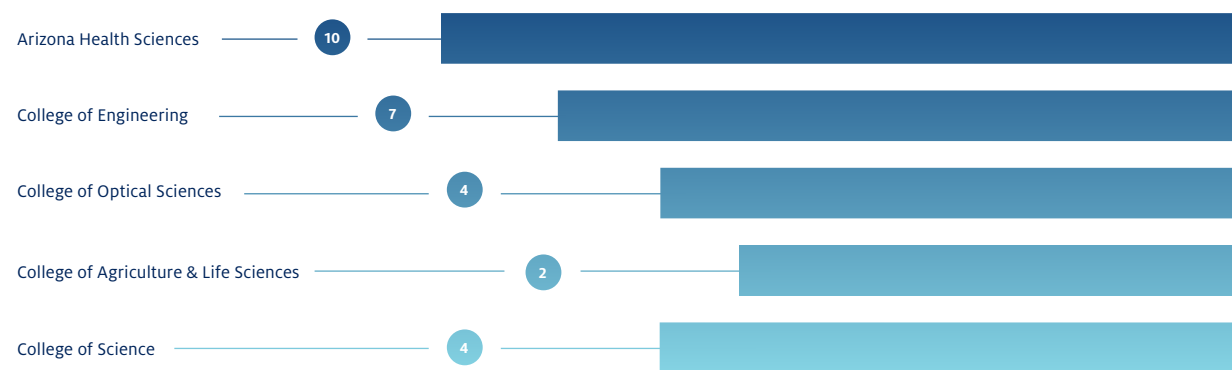
ASSET DEVELOPMENT

In FY2019, TLA funded 16 new asset development projects crossing multiple colleges and disciplines to move early-stage inventions toward being licensable, market-ready projects.

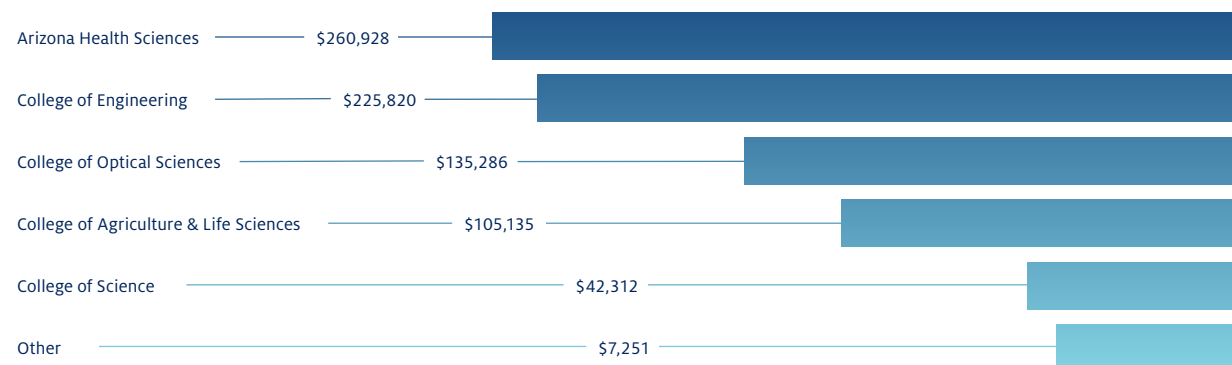
16 NEW PROJECTS FUNDED



AWARD COUNT PER UNIT



AWARD AMOUNTS BY UNIT



A NEW BLOOD TEST FOR CANCER

CHALLENGE

When testing for diseases such as lung cancer, doctors know that tissue biopsies are necessary and potentially life-saving, though the procedures used to gather tissue can lead to dangerous complications, from bleeding to lung collapse.

"Being involved in the I-Corps program and working with TLA has been a very positive experience for us. We've received great support and advice as we move toward commercialization. We are excited about our technology, which we're calling DDX-Sentinel, and its potential to help patients."

Dr. Mark Nelson, Professor of Pathology & DesertDx Chief Executive Officer

SOLUTION

To lower the need for invasive procedures, Dr. Bernard Futscher, professor at the UArizona College of Pharmacy, and Dr. Lukas Vrba, assistant research scientist at

the University of Arizona Cancer Center, combined the latest discoveries in epigenetics with new methods in informatics to create a new breed of "liquid biopsy"

– a blood test for screening, detecting and monitoring cancer.

Together with Dr. Mark Nelson they launched DesertDx to bring the invention to doctors and their patients.

✓ GUIDANCE FROM MENTORS-IN-RESIDENCE

✓ RECIPIENTS OF ASSET DEVELOPMENT FUNDING

✓ I-CORPS PROGRAM GRADUATES

VENTURE DEVELOPMENT

Economic impact of UArizona Startups from 2016 through 2018.*

*Source: McGuire Center for Entrepreneurship (June 2019). The Economic Impact of Tech Launch Arizona (TLA) and the TLA-Linked Companies it has Enabled (2016, 2017, and 2018); and potential future economic impact.

71

STARTUPS LAUNCHED THROUGH FY18

5,236

JOB'S CREATED & EMPLOYMENT GROWTH

\$585.7M

POSITIVE ECONOMIC IMPACT FOR ARIZONA

\$251.5M

INCOME FROM EMPLOYMENT LABOR

\$25.4M

GENERATED FROM STATE & LOCAL TAXES

\$14.24

IN EMPLOYMENT INCOME GENERATED FOR EVERY \$1 SPENT

FY2019 STARTUPS

ICRX, INC.

Developing a holographic binocular adaptive see-through phoropter.

James C. Wyant College of Optical Sciences | College of Medicine - Tucson

EARDG PHOTONICS, INC.

Developer of enhanced augmented reality display glasses.

James C. Wyant College of Optical Sciences

PROCYON TECHNOLOGIES

Developing an artificial pancreas cell encapsulation device.

College of Medicine - Phoenix | BIO5 Institute

CLEAN EARTH TECH

Bringing a new biocompatible material for dust control to market.

College of Engineering

FIBRONOX

Working to treat fibrotic disorders with Nox4 small molecular inhibitors.

College of Medicine | BIO5 Institute

SCINTILLATION NANOTECHNOLOGIES

Bringing to market novel nanoparticles for the detection of radioisotope activity.

College of Science | College of Medicine - Tucson | BIO5 Institute | UArizona Cancer Center

DESERTDX

Developing an approach to directly identify cancer-specific methylation regions within the human genome.

College of Pharmacy | BIO5 Institute | UArizona Cancer Center

XORALGO, INC.

Bringing to market an error correction method that improves database failure rate, increases speed and storage rate over the current RAID 6 technology.

College of Science

SIDECAR LEARNING

Bringing to market a web-based tool to build engaging and pedagogically sound tutorials.

UArizona Library

EXTREME CER NANO

Developing a high temperature graphene-based ceramic material for extreme environments.

College of Engineering

INTELICO THERAPEUTICS

Drug target discovery and precision therapeutics based upon probabilistic models of disease.

College of Medicine - Tucson

1,600 COMMERCIAL NETWORK MEMBERS

Through volunteering their expertise, TLA's 1,600 Commercialization Network members provide input to TLA employees and teams as they develop strategies and pathways to move new UArizona technologies into the public sphere.

30 COMMERCIALIZATION PARTNERS

Some of our network members want greater involvement. They are looking for their next entrepreneurial opportunity and want a closer, earlier look at emerging technologies. Through our Commercialization Partner program, we have engaged 30 individuals who regularly participate in team meetings, offering indispensable advice, connections and perspectives to our conversations.

4 MENTORS-IN-RESIDENCE

These seasoned technology entrepreneurs help startup teams grow technologies into successful ventures.

76 SHORT-TERM ENGAGEMENTS

have been made between network members and startups.

6 LEADERSHIP POSITIONS

in startups have been filled by network members this year.

NSF I-CORPS

TLA has continued to deliver the I-Corps program over the past year. Having completed our three-year grant, the NSF has provided an extension to allow us to continue to provide the beneficial program to UArizona startup teams. Through I-Corps, TLA offers grants of up to \$3,000 to university-related entrepreneurial teams working to bring their inventions to the world, with those funds going towards customer discovery.

117 TEAMS SERVED

since TLA was named an I-Corps site in 2016.

27 TEAMS SERVED

in FY 2019.

A TEAM TO #MAKEITHAPPEN



Thank you to every team member for making this past year such a success. From our advisory board to the community of UArizona inventors to all of our ecosystem members and of course our staff, we couldn't have the impact that we do without everyone's contributions.

THANK YOU.

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