UNIVERSITY OF MICHIGAN

U-M Tech Transfer

IMPACT REPORT

“Through technology transfer, U-M actively engages industry, venture, and community partners in the transformation of discoveries into new products, processes, and services that help society realize the promise of university research.”

— S. Jack Hu
U-M Vice President for Research

In FY 2017, University of Michigan’s Office of Technology Transfer continued to break new ground, as our staff worked with U-M researchers on a record-setting 444 invention disclosures, negotiated 173 agreements with commercialization partners, and helped launch 12 startups.

These achievements would not have been possible without the superb research of U-M faculty, the expertise of our staff, the support of our university, and the generous participation of our business, venture, government, and community partners. Special thanks are due to our partner institutions across campus—including the Business Engagement Center, the Center for Entrepreneurship, Fast Forward Medical Innovation, Innovation in Action, and the Zell-Lurie Institute.

While I am new to the role of Associate Vice President for Research – Technology Transfer and Innovation Partnerships and can hardly take credit for the accomplishments of 2017, I can tell you with confidence that we anticipate even greater success in the year ahead, as the U-M entrepreneurial ecosystem expands, and as we forge new relationships in service of our mission to ensure that technologies developed at the University of Michigan have every opportunity to make a positive impact in the world.

On behalf of the entire U-M Tech Transfer team, I am proud to present this report featuring our performance metrics for 2017, and I look forward to working with you in the coming year.

Kelly B. Sexton, Ph.D.
Associate Vice President
for Research – Technology
Transfer and Innovation
Partnerships
University of Michigan

In 2017, Dr. **JUANITA MERCHANT** was issued a patent for a biomarker associated with the diagnosis of Irritable Bowel Syndrome and Crohn's Disease. Officially known as the Single Nucleotide Polymorphism (SNP) C Variant Test, this DNA-based clinical diagnostic tool has the potential to reduce the need for invasive procedures such as endoscopies, shorten the time required to make an accurate diagnosis, and help guide clinicians in prescribing an appropriate and personalized diet for individual patients.

"Last year, thanks in large part to the efforts of U-M Tech Transfer, we were granted a patent for a new clinical diagnostic technology. This is tremendously exciting, since it represents an essential step on the path to validating the technology and, ultimately, moving this new diagnostic approach into clinical settings, where it can have a tangible influence in the lives of patients. As a first time inventor, I really couldn't have been any happier with the process."

— Juanita Merchant, MD, PhD
U-M Program in Biomedical Science

For over 100 years, traffic signals have worked primarily on fixed parameters, unable to accommodate real-time conditions. Today, most traffic signal control systems are based on costly fixed-location vehicle detection sensors that are prone to failure and often default to fixed settings. However, by leveraging advances in connected vehicles, U-M Professor of Civil Engineering **HENRY LIU** has successfully developed smart traffic signal technology that effectively transforms any vehicle into a mobile sensor for traffic flow. Harvesting data from connected vehicles, this new technology—now being tested in China—has the potential to create a reliable, affordable, adaptive system for optimizing the flow of traffic at intersections.

"U-M Tech Transfer has been instrumental in moving this technology forward — first through patent protection, and then by negotiating a licensing agreement with Didi Chuxing, the world's largest mobility service company. Currently, our smart signal system is being deployed in the City of Jinan, and plans are underway for expanding the network to 400 cities across China. Already, we're seeing traffic flow improvements of anywhere from 10 to 30 percent."

— Henry Liu
Professor of Civil and Environmental Engineering
Research Professor – University of Michigan
Transportation Research Institute (UMTRI)
Chief Scientist - Didi Chuxing

12 NEW BUSINESS **STARTUPS**

ATGC
Transgenic rabbit disease models for therapeutics development

Brio Device
Intelligent, intuitive intubation devices for the insertion of endotracheal breathing tubes

Elegus
Separator nanotechnology for safer, longer-lasting lithium-ion batteries

Epione MedTech
Novel catheters to reduce infection through long-term nitric oxide release

EVOQ
Nanodisc vaccine technology for cancer immunotherapy

Give and Take
Smart tools for building engagement and social capital for corporations and large organizations

Global HMRC
Health risk assessment services and products to manage organizational population health and health care costs

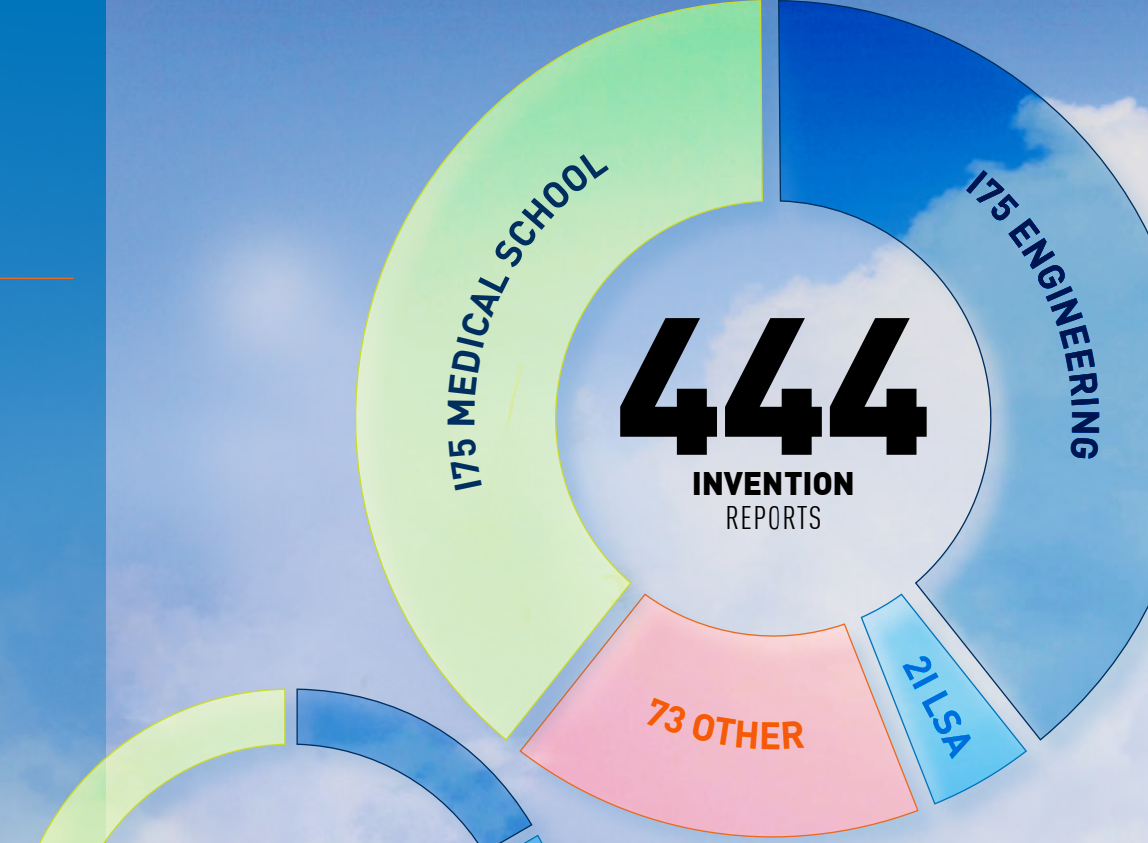
Irenix Medical
Cryo-anesthetic device for intravitreal injections

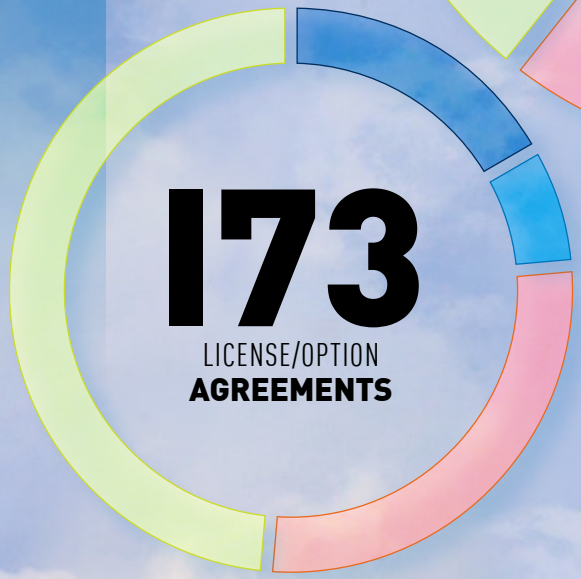
Mood Lifters
Mental wellness program to motivate change through learning, application, and accountability in a peer run group environment

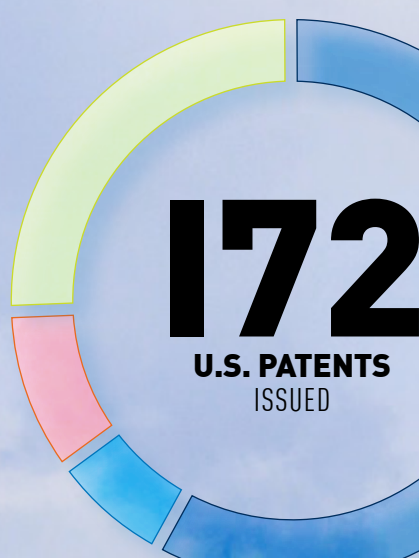
Neurable
Brain computer interface technology to control physical and digital objects with brain activity

Nynex
Small molecule deubiquitinase inhibitors (DUBs) for cancer treatment

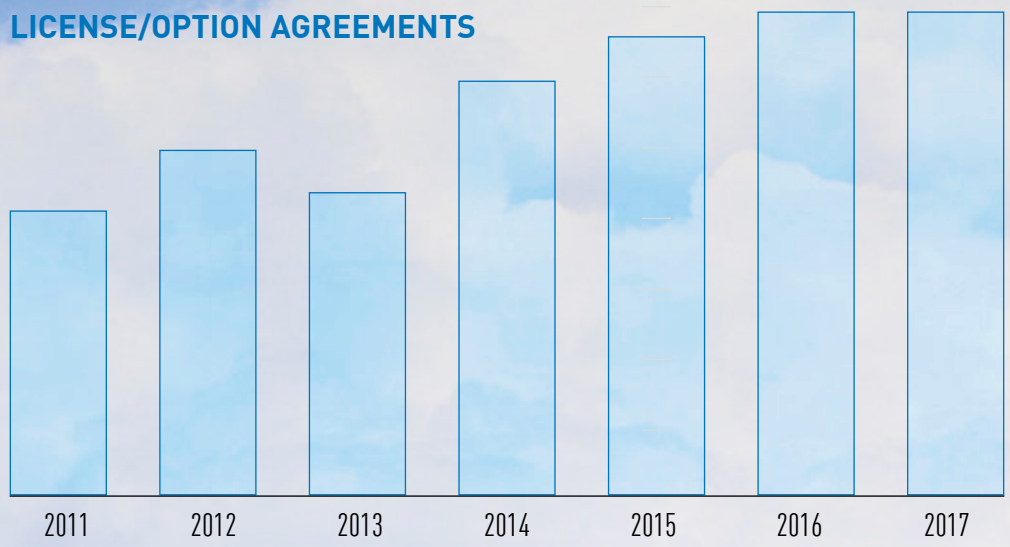
Ripple Science
Web-based software to facilitate the recruitment and management of research participants for clinical trials



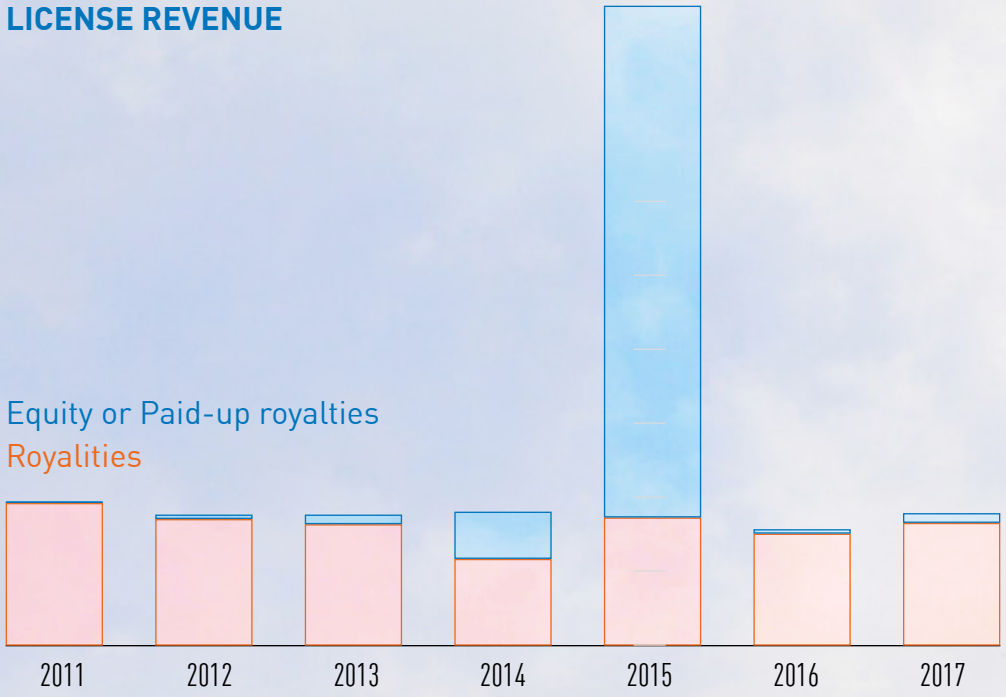




LICENSE/OPTION AGREEMENTS



LICENSE REVENUE



18 COMPANIES IN **VENTURE ACCELERATOR**

Arborsense
Cartox
Cubeworks
Diapin
Elegus
Endectra
G-HMRC
Genomenon
Hygratek
Inmatech
Mekanistic Therapeutics
Mountain Pass Solutions
Moxytech
ONL Therapeutics
Oncofusion
Opsidio
PHASIQ
STEL Technologies

"Having worked in industry for so long I wasn't sure what to expect, in a university setting. I soon discovered that U-M and the Biointerfaces Institute offer significant resources, and excellent opportunities for collaboration. Also, the university's tech transfer ecosystem has been proactive in helping us do what's necessary to make sure this potentially breakthrough technology that we've discovered has the chance to succeed, and to reach patients in clinical settings."

— Anna Schwendeman
Assistant Professor of
Pharmaceutical Sciences

Despite its initial promise, cancer immunotherapy currently has an efficacy rate of 20 to 30 percent, leaving the vast majority of patients without viable treatment options. But that may soon change, thanks to a new nanodisc vaccine technology developed by U-M researchers **ANNA SCHWENDEMAN** (center) and **JAMES MOON** (at right). When paired with commercially available immune checkpoint inhibitors, their synthetic high-density lipoprotein (sHDL) nanodisc delivery system has consistently demonstrated its ability to stimulate the immune system, eliminate tumors and provide long-term protection against relapse in multiple animal models. With the assistance of Tech Transfer, Schwendeman, Moon and biotech executive William Brinkerhoff (at left) launched EVOQ Therapeutics LLC.

TECH TRANSFER
UNIVERSITY OF MICHIGAN

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U-M TECH TRANSFER TEAM

Row 1 (left to right): Jeremy Nelson, Tara Smrchek, Dave Repp, Janani Ramaswamy, Rick Brandon, Jena Ault, Ed Pagani, Luana King, Jodie Richardson
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Row 3: Drew Bennett, Greg Choiniere, Steve Maser, Bryce Pilz, Keith Hughes, Mike Psarouthakis, Barbara Koenig, John Corthell, Tiefei Dong, Stefan Koehler, Joohee Kim, Richard Greeley

THIS YEAR, UNIVERSITY OF MICHIGAN RESEARCHERS DISCOVERED 444 WAYS TO MAKE THE WORLD BETTER

Aerospace Engineering
A Smoothed and Regularized Fischer-Burmeister Solver for Embedded Real-Time Constrained Optimal Control Problems in Automotive Systems
Retrospective Cost Adaptive Control Using Modulated Target Models
Self-Healing Through Isocyanurates
StabFlow

Anesthesiology
Neuraxial Needle Guidance Device
University of Michigan Sedation Scale
Guided Video Laryngoscope

Architecture
A Method for Actuation Through Knit-Constrained Pneumatics
A Method to Produce Graded Structural Properties in 3D Textile-Reinforced Composites
Dichroic Glass Light Well
Extrusion Die for Large Scale 3D Additive Manufacturing
Eyewear View Sun Blocker
Hospital Door Noise Suppressor
In-Vehicle Visual Comfort Sensing System
Interactive Mapping Tool: Urban Multimodal Access Design
Nozzle Cooling System for 3D Additive Manufacturing
Thermocromics and Autism Thermal Regulations: Towards Body Architecture Design Guidelines

Bioinformatics
C-QUARK for Contact-Map Assisted Ab Initio Protein Structure Prediction
QUARK for Ab Initio Protein Structure Prediction
GPCR-I-TASSER: A Computer Tool for High-Resolution Structure Prediction of G Protein-Coupled Receptors

Biological Chemistry
Agent for Improving Cardiac Performance
Adaptation of an Enzyme-Coupled Fluorescent Methyltransferase Assay for High-Throughput Screening
Enhancement of Cysteine Production and Reduction of Biofilm Formation in Escherichia Coli
Treatments for Adrenocortical Carcinoma and Conditions of Excess Steroid Production by Combinations of Agents that Cause Cytotoxic Cholesterol Accumulation

Biologic and Materials Science
Biomimetic Microspheres and the Methods of Making the Same
Double Recombination System to Edit Mouse Genome and Drive Tissue Regeneration
Implantable Long-Term Pulsatile Delivery System
Mouse DSPP -1 and -2 Frameshift Mutation Models

Biomedical Engineering
3-Axis Side-View Confocal Fluorescence Endomicroscope
Cell Laser Array
Continuous Capnography for Home Care
Electric Focus Steering Method and Ultrasound Phased Array Transducer System for Noninvasive, Rapid Tissue Ablation Using Histotripsy
High Contrast, High Resolution Imaging Method Based on Laser Emission
Hydro-Seq: High Sample Efficiency Single Cell Whole Transcriptome Analysis Technology
Integrated Histotripsy and Bubble Manipulation Device to Deliver Speedy Tissue Ablation
Integrated Micro-Photoionization Detector with a Sub-Micron Thick UV Transmission Window
Laser Emission-Based Microscope
Mechanism for Remote Axial Scanning in Multiphoton Microscopy
Medium for Enhanced Acoustic Coupling in Ultrasound Mediated Therapies
Peptide Specific for Fibroblast Growth Factor Receptor 2 for Detection and Therapy of Gastrointestinal Adenocarcinomas
Platform for Detection of Metastatic Potential
Platform for Monitoring Autoimmune Disease
Portable Thermoelectric Temperature-Stabilized Cooling Device
Pulley-Assisted Patient Turner
Scalable Multiplexed Drug-Combination Screening Platform Using 3D Microtumor Model for Precision Medicine
Tissue Specific Temperature Control
Two-Dimensional (2-D) Material Based Ion Exchange Membrane Sensors
Nerve Stimulation for Glucose Modulation
Peripheral Nerve Stimulation to Elicit Sexual Arousal Responses

Biomedical Research
Differentiation of Theca Cell Like Androgen Producing Cells
Encapsulated Stem Cell-Derived Liver Tissue

Business School
Bluetown - Customer Centric Leadership and Design Exercise
Promoting Human Cooperation

Cardiac Surgery
Repurposing Valproic Acid for Acute Myocardial Infarction

Cardiology
A Method of Assaying for Receptor Activation Relevant to Equine Reproduction
Method to Use Carbon Monoxide to Treat Implantable Device Thrombosis and Inflammation
Plasminogen Activator Inhibitor-1 Inhibitors and Methods of Use Thereof
Therapies for Prevention of Contrast Induced Nephropathy
ApoE and CETP KO Rabbits
Carbon Monoxide-Based Therapeutics in Vascular Disease
Concentration of Unconventional Analytes in a Dilute Fluid
Two-Phase Technique to Restore Artery Patency and a Catheter Temperature Control System in Atherectomy

Chemical Engineering
A Therapeutic Formulation that Includes Biodegradable Nanoparticles Comprised of a Non-Stoichiometric Ratio of at Least One Therapeutically Active Protein and a Synthetic Polymer Crosslinker
Biomimetic Biodegradable Nanoparticle for Pesticides Formulations
Biomimetic Vibration Isolation
Enhancement of Forward Scattering, Suppression of Backscattering and Their Spectral Tuning by Hedgehog Particles
Heavy Metal Sensors for Drinking Water Focus on Lead Detection with Simple Platinum Electrodes
High Voltage High Energy Density Supercapacitors Based on Ionic Liquids
Injectable Multidrug Delivery Hydrogel for Postoperative Management Following Ophthalmic Surgery
Janus Particle Based Oral Cancer Chemopreventive Rinse with Oral Mucosal Substantivity
Materials-Sensing LIDARs for Robotics, Drones, and Vehicles with Different Degrees of Automation
Micro Aphaeretic System for In-Vivo Circulating Tumor Cell Isolation and Analysis
Porous Material for Continuous Radiative Cooling
Synthesis of Hedgehog Mesoparticles by Self-Assembly of Nanoparticles
Ultraviolet Drinking Water Purification System

Chemistry
Chiral Spiroketal-Based C2-Symmetric Scaffold for Asymmetric Catalysis
Electrochemical Liquid Phase Epitaxy
Electrochemical Nitric Oxide Generation for Inhalation Therapy
Hydrogen Peroxide Solvates with High Energetic Content
Polymer-Based Lipid Nanodiscs and Macrodiscs
Preparation and Uses of 1-Aminonorbornanes
Redox Catalysis Facilitates Lignin Depolymerization
Separation Medium for Capillary Electrophoresis Enabling Fast and Sensitive Detection of Biomolecules
Structure-Based Chemical Shift Assignment

Civil and Environmental Engineering
An Augmented Reality Environment for Connected and Automated Vehicle Testing
Detector-Free Signal Control with Crowd-Sourced Vehicle Trajectory Data
Dynamic Membrane Anaerobic Bio-Reactor to Enhance Hydrolysis of Lignocellulosic Substrates
enComfort - A Personalized HVAC Control Smartphone Application Framework for Improved Human Health and Well-Being
Piezoelectric Sensing Strategies for Health Assessment of Osseointegrated Prostheses
Self-Reinforced Cementitious Composite for Building-Scale 3D Printing

Climate and Space Science Engineering
Enclosed Wave/Particle Energy Converter Module/Method
Road Condition Detection System
Storm Intersection Forecast Tool

Dentistry
CBCE Clinical Rotations Assessment Program
Head and Neck Cancer Cell Lines Stably Expressing shRNA-glutaminase, shRNA-integrin Alpha V, and Control shRNA Constructs
Metabolomic Data Sets: Derived from Profiling of Head & Neck Cancer Patient Tissues & Saliva
Nanoparticle Vaccine Formulations Against Human Papillomavirus-Positive Cancer
Tremor Toothbrush

Dermatology
Bacterial Cell Lines

Electrical Engineering and Computer Science
A New Bracket Challenge for Sports Leagues/Tournaments
A Silicon-Carbide MOSFET Based High-Efficiency and High-Power-Density Bidirectional Charger for EV Fast Charging Incorporating Renewable Energies
Assisted Physical Rehabilitation Using Wearable Inertial Sensors and Real-Time Feedback
Automated Software Refactoring Technology
Cloud Computing Trust Model
Fast Classification of Lithium-Ion Batteries for Second Use
Intelligent Eco-Driving Aid System for Improved Energy Efficiency of Hybrid Electric Vehicles
Line-of-Sight Low-Power Optical Communication System for Vehicle-to-Vehicle and Vehicle-to-Infrastructure Mobile Communication Networks
Physical Fingerprinting of Controller Area Network Bus and Electronic Control Units
System & Method to Determine Perceived Workload in an Autonomous Vehicle
Using System-On-Chip Technology to Detect Drivers Concentration Level
Wearable Cooler
A 12.1mW Quadrature Fully-Integrated Tri-Band GPS Receiver in 65nm CMOS
A Framework for Implementing Decentralized Action Integrity in Trigger-Action Platforms
A Framework for Privacy-Respecting Implicit Data Collection
A Low Power High Gain RF Amplifier Technique
A Mixer-Last Architecture for High Efficiency Transmitters
A Reconfigurable In-Memory Cryptographic Processor for IoT
A Scalable Low-Power Reconfigurable Accelerator for Action-Dependent Heuristic Dynamic Programming
A Variable Transmission Thin Film
A Workflow and UI for Guiding Conversational Data Collection and Annotation
Accelerating DNA Alignment Using BWA by Running on GPUs
An Area-Efficient PUF Design
Anticipatory Scheduling Algorithm for Vehicular Data Transfer Using Multipath TCP
Bit-Shuffling Technique to Improve Robustness of a PUF Against Machine Learning Attacks
Censys: A Search Engine Backed by Internet-Wide Scanning
Clank: Architectural Support for Dynamic Idempotence Tracking
Configurable Convolutional Neural Network Processor
Constructing Informative Outcomes to Guide Multi-Policy Decision Making
Control Method for Power Converters
Control of Molecular Orientation and Film Crystallinity in Organic Light-Emitting Devices
Crowdsourcing Tools for Vehicle Crash Analysis
Dashboard Based Vehicle Display and Transparent Dashboard
DBSeer: Pain-Free Database Administration Through Workload Intelligence
Detecting Repeatability of Out-of-Order Execution Schedules
Diamond Based Transistors
Efficient Memory-Based Interconnect for State Transition
Efficient Spatio-Temporal Video Codec Method and Architecture for Cognitive Processing
Financial Market Simulation Software
Fingerprinting Driver with Mobile IMU Sensors
Floating-Gate Transistor Array for Performing Weighted Sum Computation
Full-Color Single Nanowire Pixels for Projection Displays
Galois Field Arithmetic Unit
Game Analysis
Grouped Compressed Sparse Rows Format for Storing Sparse Deep Neural Networks
High Efficiency and Colored Solar Panels
High Efficiency Single Junction Non-Fullerene Acceptor Based Semi-Transparent Solar Cells
High Efficiency Visible and Ultraviolet Nanowire Emitters
High Efficiency, Low SAR Wireless Power Transfer
Hot Excited State Management for Long-Lived Blue PHOLEDs
In-Car Phone Localization for Detection of Distracted Driving
Integrated Lenses for Collimated Light Output from a Micro LED Array
Large Area, High Performance Transparent Conductor Based on Selective Electroless Plating
Latent Oscillator Frequency Estimation for Ranging Measurements
Leakage-Biased Synchronous Level Converter
LED Microdisplay Devices with Monolithically Integrated Full-Color Pixels
Lenticular-Lens-Based Colored Antiglare Dashboard Surfaces and Dashboard Integrated Displays
Lifetime Enhancement of Blue PHOLEDs with Graded Dopants in Cohost EML
Long-Term Dependencies for Emotion Recognition
Low Refractive Index Dielectric Layer Between Organic Layers and Metal Reflector in OLEDs
Low-Power Receiver for FSK Back-Channel Embedded in 5.8GHz Wi-Fi OFDM Packets
Meta-Policies for Cyber Insurance
Method for Fair and Accurate Metering for Wireless Power Transfer
Method of Growing Uniform Semiconductor Nanowires without Foreign Metal Catalyst and Devices Thereof
Method to Charge Mobile Devices via User Interaction and with Relaxation Awareness
Method to Estimate Battery Health for Mobile Devices Based on Relaxing Voltages
Mold for Making Three Dimensional Microstructures
Monolithic III-Nitride 1.3 Near-Infrared Disk-in-Nanowire Array Lasers Directly on (001) Silicon
Monolithic III-Nitride Nanowire Infrared Detectors on (001)Si Substrates
Monolithically Integrated Metal / Semiconductor Tunnel Junction Nanowire Light Emitting Diodes
Mountable, Electronic Device Carry Case
Moving Sensing Operation of a Main Memory from Row Activation to Read Operation
Nanowire LEDs for Full-Color Display Applications
Near-Infrared Non-Fullerene Electron Acceptors for High Performance Polymer Solar Cells
Neighbor-Guided Semi-Global Matching Optical Flow
Node Pruning with Mask Layers for Deep Neural Network Acceleration
Optically Active Dilute-Antimonide III-Nitride Nanostructures for Optoelectronic Devices
Organic Light Emitting Devices Using Thin Doped Ag Film as Electrodes
Organic Light Emitting Devices with No Plasmonic Losses
Quiesce
Receivers for Spread Spectrum Wireless Power Transfer
RegLess
RF Front-End for Full Duplex Wireless Communication
Root-Cause Analysis: Identifying the Compromised Electronic Control Unit (ECU) of Connected Vehicles
Sea of Electrode Array (SEA): Scalable Three-Dimensional High-Density High-Aspect-Ratio High-Electrode-Count Micro-Probe Array for Neural Recording and Stimulation
Sensor Circuits for X-Ray Imagers
Skipping Precharge Command in a Main Memory
Sparse Coding with RRAM Crossbar
SRAM Based Sequence Dependent Challenge Response PUF
Sub-Electrode Microlens Arrays Enhance Light Extraction Efficiency for Organic Light Emitting Devices
Top-Emitting Organic Light-Emitting Devices Using a Low Refractive Index Dielectric and High Refractive Index Microlens Array
Top-Emitting Organic Light-Emitting Devices Using a Reflective Sub-Electrode Grid
UV Transparent Electrode Comprising Thin Metal Film and LEDs Made Thereof
Validating Non-Deterministic Behavior of Memory Consistency Models in Post-Silicon Validation

Emergency Medicine
Airway Rescue Device
Barreleye: Neurocritical Care Surveillance System
Mechanism for Shock Index Computation
Ocular Impedance Device for Brain Health Monitoring
Physiologic Sleep and Consciousness Monitor
Therapeutic Vibration Device for Critical Care
Tourniquet for Civilian and Military Trauma Use
Coronary Vessel Segmentation and Stenosis Detection Using Deep Learning and Image Processing Techniques

English
TokenBooks Pages

Family Medicine
MeTime Self-Acupressure for Treating Cancer Related Fatigue
American Sign Language Anxiety Screener
American Sign Language Depression Screener

Gastroenterology
A Method to Cryopreserve Human Tissue Samples that Allows Subsequent Culture of Live Tissue
Family Health History Questionnaire
Induction, Growth and Expansion of Multipotent Lung Progenitors from Human And Mouse Tissue
Method for Creating Custom Fit 3D Printed Ostomy Wafers
Method of Use as an Anti-Fibrotic Medication for BM-1244 (APG-1244)
Omega-3 Fatty Acid Metabolite Compositions and Methods of Use Thereof for Treatment and Prevention of Gastrointestinal Disorders and Visceral Hypersensitivity
Predictive Algorithms for Successful Therapy of IBD with Vedolizumab
Probiotic Compositions and Methods of Use Thereof for Treatment and Prevention of Gastrointestinal Disorders
Synthetic Extracellular Matrix for Human Pluripotent Stem Cell-Derived Organoid Generation and Delivery
Anti-Fibrotic Effects of an Axl Inhibitor, TP-0903

Hematology and Oncology
Intermediates for Preparation of Small-Molecule Protein Degraders
Low-Error Single-Molecule Sequencing of Nucleic Acids
Selective Small-Molecule Antagonists of Bcl-2 Protein
Small-Molecule Inhibitors of DCN1
Small-Molecule Inhibitors of LSD1
Small-Molecule Inhibitors of WDR5
Tumor Response Assessment Platform
ALK Inhibitors as Treatment of Cancer
Aminopyrimidines as Inhibitors of ALK Protein
Combination CD123 and C-Type Lectin Molecule 1 Targeted T Cells for Acute Myeloid Leukemia
Covalent Small-Molecule Inhibitors of DCN1 Protein
Covalent Small-Molecule Inhibitors of Menin
Detection and Quantification of Single Molecular Analytes Using Transient Interactions with Peptide and Aptamer Probes
Fused 1,4-Diazepines as BET Bromodomain Inhibitors

Hospital Administration
OCM Treatment Plan Generator
Patient Navigation
University of Michigan Comprehensive Cancer Center Clinical Trials Finder
Clinical Research Training Workshop
Full Featured Scalable Web-Based Survey Tool

Infectious Diseases
Editing of Human Endogenous Retroviruses Impairs Cancer Cell Replication and Survival
Oral Delivery of Commensal Bacterial of C. Lachnospiraceae Strains Prevents Obesity
Restoring the Gut Microbiome
A Fluorescence Mutation Rate Assay

Internal Medicine
Electrical Pacing Frame for Multiwell Plates
Treatment for Cholesterol Lowering and the Treatment and Prevention of Cardiovascular Disease

Kinesiology
Medical Economic Reporting Tool-Economic Projection

Lab Animal Medicine
Sustained Release Parenteral Therapeutics for Use in Laboratory Animal Medicine and Veterinary Medicine

Life Sciences Institute
A New Tool / Agent for Therapy and Skin Protection
Biocatalytic Synthesis of Cryptophycin Anticancer Agents
Generation of Conditional Rictor Flox/Flox Mice
Recombinant Human NRG4 for the Treatment of Type 2 Diabetes and NASH

Materials Science and Engineering
Molecularly Engineered High Thermal Conductivity Polymer for Electronic Device Encapsulation and Thermal Interface and Methods for Making the Same
Precision Bio-Chemotronic Devices and Systems
Semiconductor Circuits and Devices Based on Low-Energy Consumption Semiconductor Structures Exhibiting Multi-Valued Magnetoelectric Spin Hall Effect
Very High Efficiency Optical Tracking and Concentration Kirigami Photovoltaic Device

Mechanical Engineering
A New Method of Improving Column EPAS Torque Feel Metrics Using Steering Rack Load
Cold Spray Apparatus with Large Area Conformal Deposition Ability
A Keyhole Refilled Friction Stir Spot Welding Method and Apparatus
A Microfluidic-Based Platform for the Label-Free Counting of White Blood Cells and Their Subtypes
Blue Hybrid Software
Bulk Solid State Batteries Utilizing Mixed Ionic Electronic Conductors
Dendrite-Free Lithium Metal Battery by Deformation-Induced Potential Shielding
Enabling Production as a Service
Highly Stable Few-Layer Black Phosphorus Generated by Pulsed Laser Exfoliation
Multi-Mode Power Split Hybrid Transmission with Two Planetary Gear Sets
Needle Biopsy Device for Accurate Guidance
Partial Vacuum Insulation for Automotive Exhaust Components
Point of Care Testing Device
Robotic Oral Appliance for Obstructive Sleep Apnea Management
Wearable Pneumatic Ultrasound Imaging Probe for Non-Invasive Continuous and Automated Physiologic Monitoring
3D Printing Method Utilizing Controlled Coiling of Viscous Jets for Porous Materials and Objects
A Saliva Collection Device for the Diagnosis of Sleep Disorders
A Wearable Head Cap for the On-Site Diagnosis of Traumatic Brain Injuries
Abrasive Wire Cutter to Restore Patency and/or Expand Cross-Sectional Diameter of Luminal Structures
Algorithm for Autonomous Vessel Collapsibility Monitoring
Anti-Icing Surfaces Exhibiting Low Interfacial Toughness with Ice
Blood Loss Collection and Measurement
Catalyst Gas Bench Control and Operation Software
Cooling Device
Customized Instrumentation to Support Task-Shifting Medical Device Development and Pre-Clinical Trial Assessment
Daylight Emulating OLED Luminaire
Devices, Systems and Methods for Three Dimensional Reconstruction
Durable Walking Aid for Low-Income Countries
High Performance Solenoid Actuated Gasoline Direct Injection Fuel Injectors
Measurement of Bicycle and Rider Kinematics Using an Array of Inertial Measurement Units
Metal Infiltrated Electrodes for Solid-State Batteries
Method for Formation of Facile Li Metal Anode Interface with a Solid-Electrolyte
Method for Suppressing Metal Propagation in Polycrystalline Solid Electrolytes
Method for Treating the Surface of Solid Electrolytes
Method of Additive Manufacturing an Internal Wave Sparse Structure with Continuously Varying Frequency and Thickness for Tunable Stiffness Throughout a Part
Piezoelectric MEMS Accelerometers
Plasmo-Optoelectronic Immunosensor
Sequential Injecting Syringe Kit
Stabilization Coatings for Solid State Batteries
Tip In Water Injection for Diesel NOx Reduction
Treating Primary Postpartum Hemorrhage in Low Resource Settings
Water Injection for IC Engine Using Captured Water
Assistive Device for Removal of Subdermal Contraceptive Implants

Microbiology and Immunology
Isolation of Monoclonal Antibodies Against Murine Norovirus
Antibodies Again Open MHC Class I Conformers in Cancer Immunotherapy

Mobile Application
Congrats Michigan Engineer! App
MPrint Mobile App
Entrain Mobile App
University of Michigan Museum of Natural History Mammoth App
Adolescent Health Initiative Spark Module
Pregnancy App
SecondLook Oral Radiology Mobile Application
Diabetes Emoticons
Diabetes Emoticons Sticker Application
MOTT ENT Post-Op: Tonsillectomy
Mobile Application for Treatment of Patients with Cardiac Rhythm Devices
Mobile Application for Patient Reported Outcome and Perioperative Data Collection
MGoView - Augmented Reality Bicentennial Celebration Experience
Messages Sticker Pack for iOS 10
The MAGIC App

Mobility
Improved Functionality, Comfort and Safety of Driver and Passenger Seats in Passenger Cars
Integrated Biometric Sensors to Improve Driver Safety
A Methodology to Advance the Implementation of Integrated Multi-Modal Mobility / Mobility-as-a-Service/ New Mobility
A New Dynamic Vehicle Rollover Test Methodology
A System and Method for Detecting Parking Behavior from GPS Data
Comprehensive Database of Vehicle Fuel Economy
Mobi-Platform - A Global Platform for New Mobility Innovators

Molecular Cellular and Developmental Biology
Regulation of Gastric Acid Secretion by a Ca2+ Channel in the Tubulovesicle
Uses for Mesalamine
Polyclonal Antibodies Recognizing Varies Species of Fluorescent Proteins
Computer Software for Neuronal Tracing and Neural Circuit Reconstruction From 3-Dimensional Multispectral Images
Genetically Encoded Non-Toxic Monosynaptic Transsynaptic Tracers
Microfluidic Device for Precise Paired Fusion of Multiple Lipid Droplets

Molecular Physiology
Label-Free, Quantitative Evaluation of Tissue Engineered Skeletal Muscle Using Multiphoton Microscopy

Naval Architecture and Marine Engineering
A Unified Fatigue Design and Life Evaluation Method for Welded Structures
Offshore Wind Energy Aeration System for Remediation of Hypoxia Zones

Nephrology
Sparsentan Controls Proteinuria for Long-Term Nephroprotection in Primary FSGS

Neurology
Dizztinct
Interrogating Neurological Disorders by a New Gene Editing Platform
Medication Combination for Cerebellar Ataxia

Neurosurgery
Acquisition and Colorization Software for Raman Microscopy
Aspiration Catheter

Nuclear Engineering and Radiological Science
A Method to Estimate the Identity and Thickness of Intervening/Shielding Materials During Gamma-Ray Spectroscopic Measurements

Nursing
Microscopy Image Analysis for Cellular and Sub-Cellular Morphological Modeling and Classification

Ophthalmology
Imaging of Corneal Diseases
Imaging of Topographies for Refractive Surgery
RetinaScope Apparatus
A Web-Based Personalized Behavior Change Program for Glaucoma Patients
Application for Cryo-Anesthesia and Analgesia

Orthopaedic Surgery
Michigan Hip Model

Otolaryngology
Ear Scaffold for Reconstruction
Ear Splint
Nasal Tissue Scaffold
Pediatric Surgical Simulators
Universal Endoscopic Telescope Adaptor
Customized Tracheocutaneous Fistula and Tracheostomy Plug
In Vivo Imaging of Cyclodextrins

Pathology
Agonists of BMP Signaling
ARlnc1 in Prostate Cancer Progression
Bridged Bicyclic Inhibitors of Menin-MLL and Methods of Use
Colored Endoscopic Surgical Clips for Anatomic Identification to Improve Turn Around Time and Patient Safety
Design and Synthesis of Novel Retinoids
Design and Synthesis of Novel, Non-irritating Retinoids
Identification and Isolation of Human LGR5 Positive Stem Cells
Metabolite Biomarkers for the Differential Diagnosis of Pancreatic Cystic Lesions
Reporter Cells for the Screening of Anti-Fibrotic Agents
Substituted Inhibitors of Menin-MLL and Methods of Use
The Michigan Portal for the Analysis of NGS Data (MiPanda)
Yoga Platform Seat
Composition and Methods of Use of NSD Inhibitors
FIZZ1 Knockout Mouse
FloxedTERT Mouse

Pediatrics and Communicable Diseases
Treatment of Cystic Fibrosis Via Microvesicle-Mediated CFTR Repacement
Treatment of Disorders of Plasma Membrane Proteins by Protein Replacement Via Microvesicles
Digital Extra-Ventricular Drain (EVD) with Integrated Intracranial Pressure (ICP) Monitor and Cerebral Spinal Fluid (CSF) Flow Monitor/Pressure Regulator

Pharmacology
Activation of IP Receptor for Prevention of Thrombosis and Thrombotic Events

Pharmacy
1,3,4-Oxadiazole Propionic Acid Inhibitors of Rho Signaling
4E-BP Stapled Peptide Mimetics
A General Strategy for Delivering Hydrophilic Drugs Tethered on HDL Nanodiscs
Apolipoprotein Compositions for Treatment of Lysosomal Storage Diseases
Biomacromolecule Delivery for Treatment of Peripheral Ischemia
Characterization and Application of Poly(Dimethyl Siloxane) for In Vivo Relevant Drug Absorption in In Vivo Relevant Dissolution
Core-Satellite Nanocomposite for Biomolecule Conjugation
Linear Polypeptides for Vaccine and Drug Delivery Applications
Macrophage-Stabilized Polymorphs of Weakly Basic Drug Salts
ManageHF4Life
Multifunctional Opioid Peptidomimetics
Oral Anti-Cancer Prodrug of Gemcitabine
Sampling Device for Diagnosis of Gastric-Intestinal Diseases
Software Used in the Detection of Drug Loss and Diversion
Streptavidin Conjugated Core-Satellite Nanocomposite for MayArray Sensor Application

Physical Medicine and Rehabilitation
A Novel System for Motor Training and Performance Enhancement

Physics
Quantum Interference Detection of Optical Frequency Comb Offset Frequency
Transformable Topological Mechanical Metamaterials
Harmonic Dual Comb Spectroscopy

Plastic Surgery
Inhibition of Cas9 Plasmid Activity
Radiolucent Hardware for Reconstructive Surgery Research
TAK1 Targeting to Improve Tissue Regeneration
Targeting NETs to Prevent Free Flap Thrombosis
Therapeutic Intervention to Prevent Movement Associated Inflammation

Psychiatry
Activity-Dependent Gene Regulation in Conditionally-Immortalized Muscle Precursor Cell Lines
Buddy-to-Buddy Program
Hair Cortisol Concentration for Prediction of Response to Electroconvulsive Therapy
Non-Pharmacologic Resources for the Evaluation and Management of Pediatric Acute Agitation and Behavioral Escalation
Project GUARD
SafERteens Therapy Session Materials
Science Communication Training: 10-week Curriculum
Science Communication Training: 6-week Curriculum
The DICE Approach
Virtual Maze Navigation Training
Web-Based Platform Supporting Student Veteran Peer Support Program
Bioinformatics Pipeline for Pharmacoepigenomic Regulatory Variant Prediction

Psychology
Biophysically-Inspired Combinations of Pre-Approved Drugs for Improved Neuroprotection Immediately After Traumatic Brain Injury
Jobs II - Preventive Intervention for Underemployed and Displaced Workers
Mood Lifters

Public Health
Microscale Collector-Injector Technologies for Passive Environmental Vapor Sampling
Motivational Interviewing Training Video

Pulmonary and Critical Care Medicine
Virtual CPAP Mask Fitting Using 3D Technology

Radiation Oncology
Cerenkov Emission Hyperspectral/Multispectral Imaging During External Beam Radiotherapy
Eclipse DVH Extraction Script
EGFR Dimer Disruptors for Tyrosine Kinase and Cetuximab-Resistant Cancer Treatment
Robust Regional and Global Liver Function Quantification from Clinical Multi-Phase MRI with Gadoxetic-Acid to Support Risk Assessment of Liver Function
SiPM Array-Based Multispectral Optical Probes for Image-Guided Radiotherapy
Software Suite for Multispectral Optical Probes for Cerenkov Emission Image-Guided Radiotherapy

Radiology
Automated System for Blood Labeling in Nuclear Medicine
Colorectal Patient-Derived Xenograft Models for Preclinical Research
Localized Hypoxia Using Perfluorocarbon-Doped, Hydrogel Scaffolds
Method for Improving Solubility and Bioavailability of Compounds
New Multifunctional MEK/PI3K Inhibitors
Second Generation Dual Inhibitors of PI3K and ERBB Family Kinase Inhibitors
Synthesis of a PET Intravascular Tracer; Ga-68 Oxine
Ultrasound Measurement of Placental Function

Rheumatology
Anti-KIR Antibodies in the Treatment of Lupus
CD6 Monoclonal Antibody
Diagnostic Immune Profiling of Retinal Degeneration Patients for Active Autoimmunity

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Software Application
Synonyms List for the Electronic Medical Record Search Engine (EMERSE)
Knowledge Grid Ecosystem Software Package
CI-TASSER for Contact-Map Assisted Protein Structure Prediction
Electronic Medical Record DataSifter
Policymaker
Explanatory Machine Learning for Prediction and Improvement of Online Job Posting Response Rates
Hybrid Feature- and Example-Based Explanatory Machine Learning

Student Affairs
Customized University of Michigan Sticker Pack for Use in Online Messaging

Surgery
Mouse for Tissue Selective Reactivation of the GLP-1 Receptor
Nitric Oxide-Releasing Polymer Filling for Biomedical Tubing Applications
Surgical Concierge
Anti-Citrullinated Histone H3 (Cith3) Monoclonal Antibody and its Application for Diagnosis and Treatment of Sepsis
IL-22 Neutralization for Cancer Treatment
Surgical Tool for Cranial Drill Alignment in Rodents
Stent Tracker

Urology
Recirculating Macrofluidic Cell and Tissue Culture System
External Dual-Lumen Cuff

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