

INVO Northwestern | INVO
Innovation and New Ventures

Inventive Activity
FY 2020

240
INVENTIONS DISCLOSED

651
PATENT APPLICATIONS

190
AGREEMENTS EXECUTED

9.2
MILLIONS IN LICENSING
REVENUES, DOLLARS

226
PATENTS ISSUED

11
STARTUPS WITH
NORTHWESTERN IP

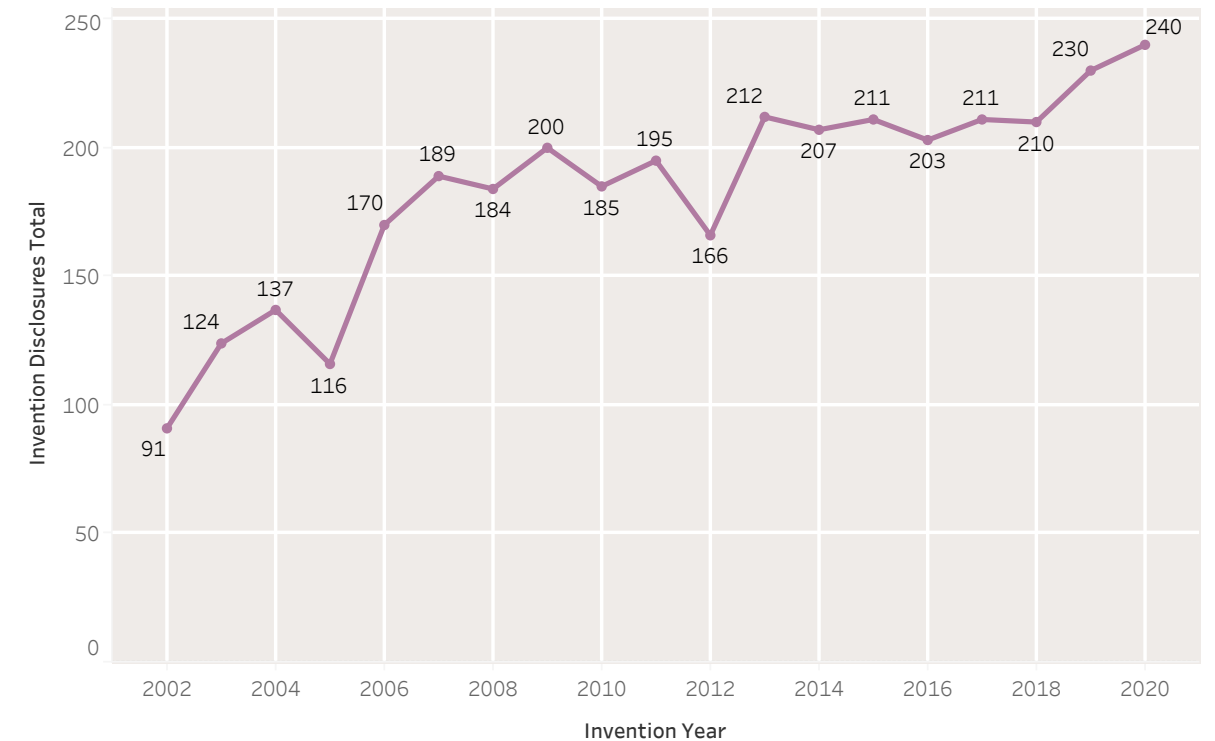
NORTHWESTERN INVENTIVE ACTIVITY

Figure 1 illustrates invention disclosure activity since 2002. In FY 2020, INVO processed 240 invention disclosures or 4.3% more than last year.

Inventorship spans both campuses. Figure 2 represents the distribution of inventive activity by school. The McCormick School of Engineering (McC) and the Feinberg School of Medicine (FSM) have the largest shares, followed by the Weinberg College of Arts and Sciences (WCAS).

Figure 3 shows the distribution of inventions by category. Therapeutics had the largest share of the inventive output. It is important to note that many inventions in the areas of chemistry, computer science, and materials are considered platform technologies with undefined markets. For example, a new software invention might find applications in the future in a variety of markets such as energy, consumer, and biomedical.

FIG. 1
INVENTION DISCLOSURES, 2002-Present



Sarki Abdulkadir, Center for Urologic Oncology

For decades, researchers have known that the MYC protein is implicated in more than half of all cancers, including breast, brain and prostate. However, it has remained an elusive target as its structure has been considered “undruggable.”

Unlike previous efforts, Sarki Abdulkadir, MD, PhD, John T. Grayhack Professor of Urologic Research and director of the Center for Urologic Oncology at the Feinberg School of Medicine, has identified a novel way to screen and identify compounds that would be more likely to successfully target MYC in animals.

In fact, he and his colleagues have identified a number of compounds that effectively block MYC activity *in vivo*. Contrary to the typical research protocol, Abdulkadir and his team first evaluated a molecule’s potential for blocking MYC before testing in cell lines and subsequently tested its tolerance in mice. After discovering that blocking



Prof. Sarki Abdulkadir

“We are attacking a protein that’s involved in the majority of all cancer types and if we are successful, the implications are going to be really big.”

MYC activity was feasible, they identified a novel small molecule, MYC inhibitor 361 (MYCi361), which showed initial promise in suppressing *in vivo* tumor growth in mice. Because it was not well tolerated, a more refined analog, MYCi975, was designed to maintain its efficacy with fewer side effects. The results to date were published last fall in the journal *Cancer Cell*.

NewCures, Northwestern’s biomedical accelerator that focuses on advancing the development of novel therapeutics, has further supported development of the identified compounds (known generally as MYCi) and the modification of these compounds to increase specificity and efficacy. The work with NewCures led to a research collaboration agreement with a major pharmaceutical partner with efforts dedicated to identifying an ideal clinical indication and devising

a formulation for effective drug delivery. These steps will take the project closer to potential human studies. Abdulkadir and his colleagues had also previously participated in INVOForward – a mentorship program to explore value proposition and commercialization strategies for Northwestern biomedical commercialization projects.

“We are attacking a protein that’s involved in the majority of all cancer types,” Abdulkadir says. “If we are successful, the implications are going to be really big. These will be new-in-class molecules. Our compounds will actually enhance the effectiveness of immunotherapy. We can change those tumor types from being nonresponsive to responsive with our compounds.”

FIG. 2
INVENTIONS BY SCHOOL

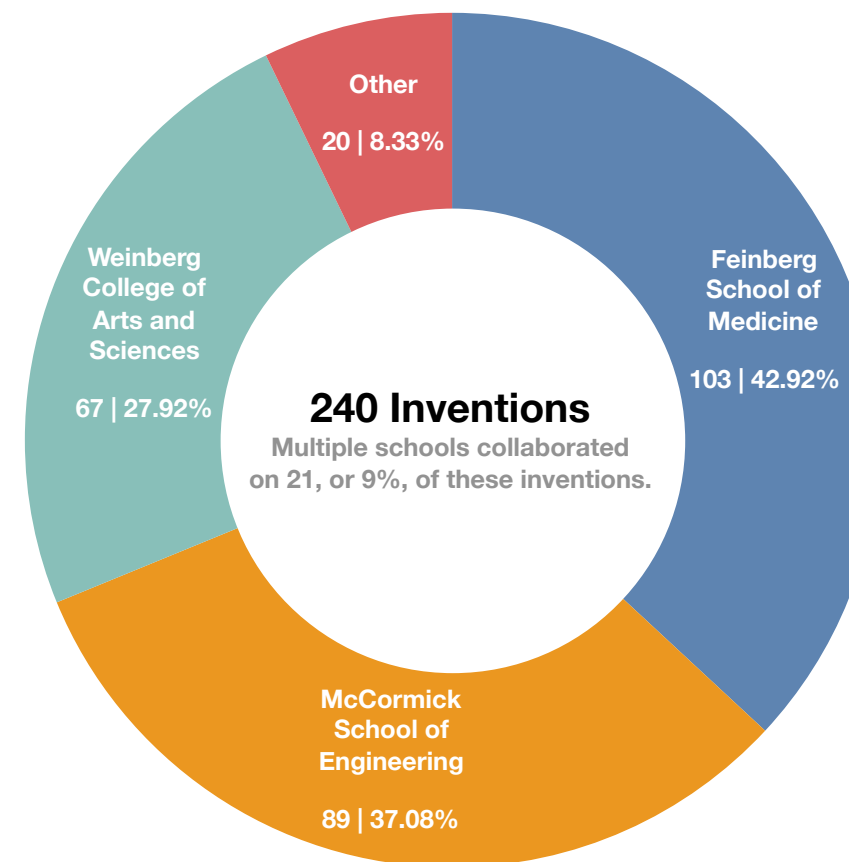
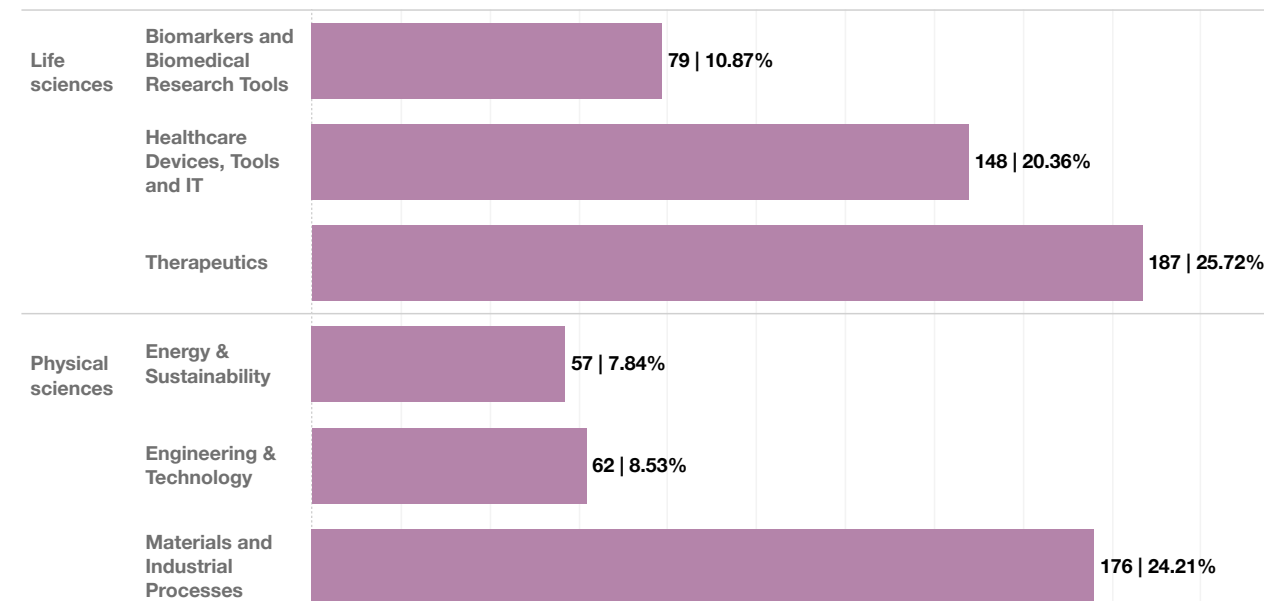


FIG. 3
INVENTIONS BY CATEGORY / INDUSTRY PIPELINE

Northwestern Inventions by Category / Industry Pipeline



Guillermo Ameer, Center for Advanced Regenerative Engineering

Imagine if your body could jump-start the regeneration of diseased, injured or missing tissue?

Daniel Hale Williams Professor Guillermo Ameer, D.Sc., works to apply regenerative engineering and nanotechnology to organ and tissue regeneration and wound healing. His bioengineering efforts specifically aim to design biomaterials that leverage stem cells and specialized proteins, unlocking their innate potential to heal the human body. Ameer focuses on surgical outcomes as the primary application of his work, whether through organ transplants, tissue repair or surgical reconstruction.

With appointments in both biomedical engineering and surgery, Ameer has more than 55 issued or pending patents in nine countries, mostly focused on his work in the aforementioned areas. While his innovations have centered on restoring normal



Prof. Guillermo Ameer

“Imagine if your body could jump-start the regeneration of diseased, injured or missing tissue?”

function in injured or diseased tissue, more recent advances in stem cell and molecular biology, as well as materials science, are providing fuel to achieve significant progress in tissue and organ reconstruction.

One of Ameer’s inventions reached the tremendous milestone of receiving FDA clearance for marketing in October 2020. His biomaterial, CITREGEN™, is a synthetic resorbable biomaterial, used to create an orthopedic screw system to help attach and stabilize soft tissue grafts to surrounding tissue and to increase its ability to regenerate back into its original form.

“The CITREGEN™ material is based on an unprecedented and innovative bioresorbable biomaterial technology developed to support the body’s normal healing processes and promote tissue regeneration,” Ameer says. “When used to fabricate devices for reconstruction of tissues

such as ligaments, blood vessels, bladder and bone, results have been impressive and beyond expectations.”

Acuitive Technologies, Inc., a sublicensee of Ameer’s startup VesselTek Biomedical, plans to commercialize the CITRELOCK System in early 2021 alongside an orthopedic distribution partner. Researchers from The Pennsylvania State University, led by CITREGEN™ co-inventor and former Ameer postdoctoral trainee Jian Yang, PhD, who leads that school’s Transformative Biomaterials and Biotechnology lab, also have worked on advancing this technology for use in various other medical applications.

At Northwestern, Ameer also serves as director of the Center for Advanced Regenerative Engineering (CARE), based at McCormick School of Engineering and Applied Sciences, which has built a collaborative, cross-sector clinical

ecosystem since its inception in 2018. It has established connections with multiple medical centers in the region, including Feinberg School of Medicine, University of Chicago Pritzker School of Medicine, The University of Illinois at Chicago, the Ann and Robert H. Lurie Children’s Hospital of Chicago, Indiana University School of Medicine, The University of Wisconsin School of Medicine and Public Health, and the Cleveland Clinic.



CITRELOCK tendon fixation devices. Credit: Acuitive Technologies

The Center has raised more than \$11 million from the National Institutes of Health, National Science Foundation, Department of Defense and private foundations, bringing together more than 40 scientists and researchers across a variety of disciplines—materials science, chemistry, biology, surgery, and biomedical, mechanical, civil and environmental engineering—who likely never would have otherwise interacted with each other, which has resulted in new research, training, and Center grant proposals to the federal government.

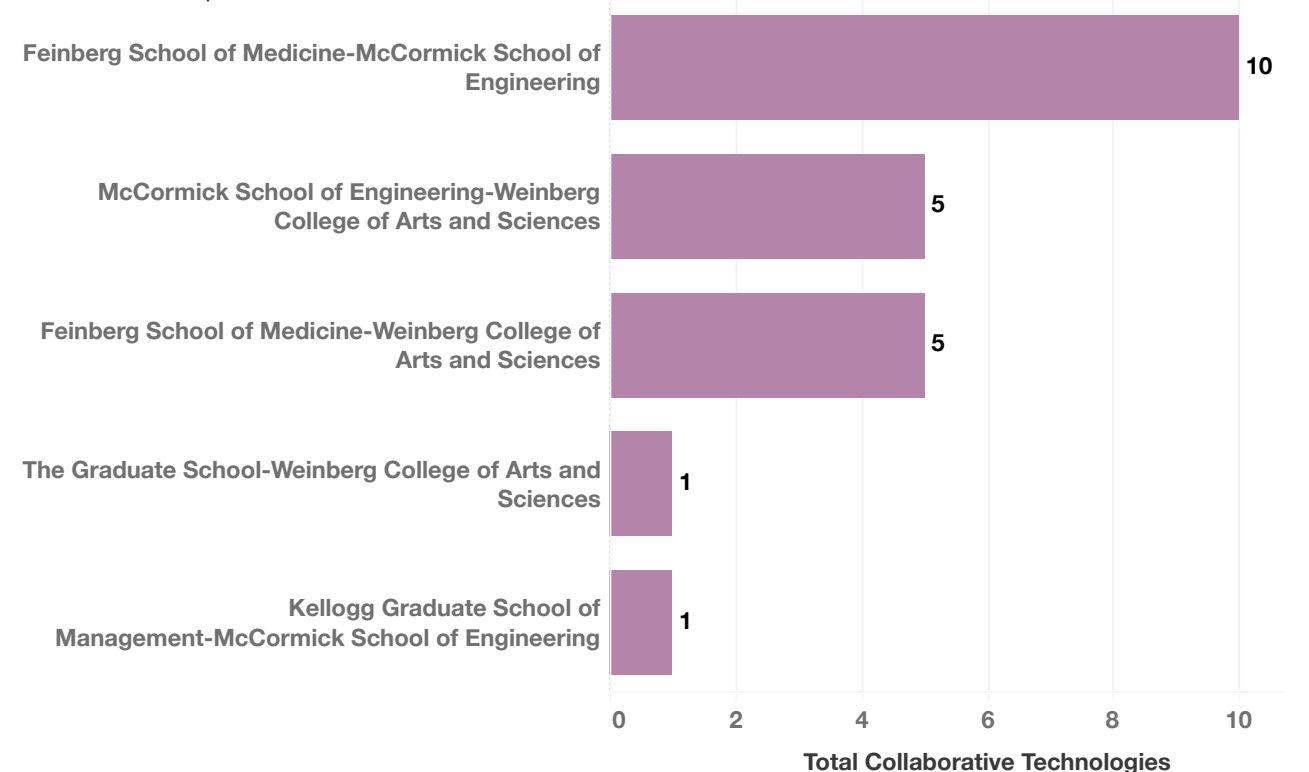
Many projects have focused on wound healing, cell transplantation, and smart regenerative

systems that can sense the microenvironment in an organ or tissue and relay that information to the patient, caregiver, doctor or manufacturer. Overall, the Center boasts more than a dozen issued and pending patents.

“It’s truly a cross-institutional effort with a goal of creating tools that will improve the outcomes of surgeries,” Ameer said. “No matter how many advances there are in the pharmaceutical market, it will not be sufficient if an organ transplant is required or diseased tissue is involved. Our center hopes to innovate new tools for surgeons to use to provide better outcomes for patients.”

FIG. 4 COLLABORATION BETWEEN SCHOOLS

Northwestern’s interdisciplinary approach is displayed by the co-inventorship activity among different schools and departments.



Total Collaborative Technologies INVO INVENTIVE ACTIVITY FY 2020

Figures 5, 6, and 7 illustrate inventive activity within each school.

FIG. 5
McCORMICK SCHOOL OF ENGINEERING INVENTIONS BY DEPARTMENT

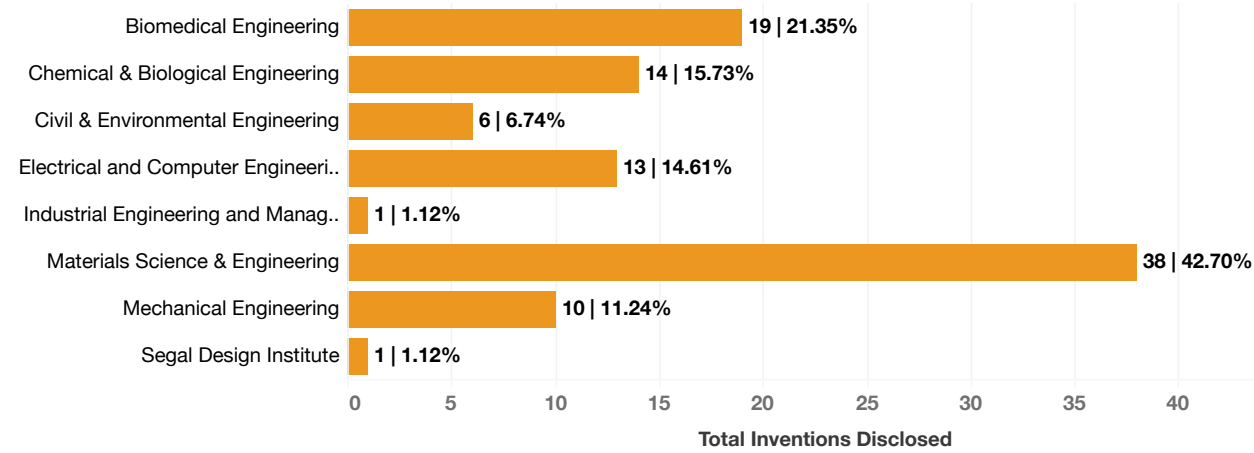


FIG. 6
WEINBERG COLLEGE OF ARTS AND SCIENCES INVENTIONS BY DEPARTMENT

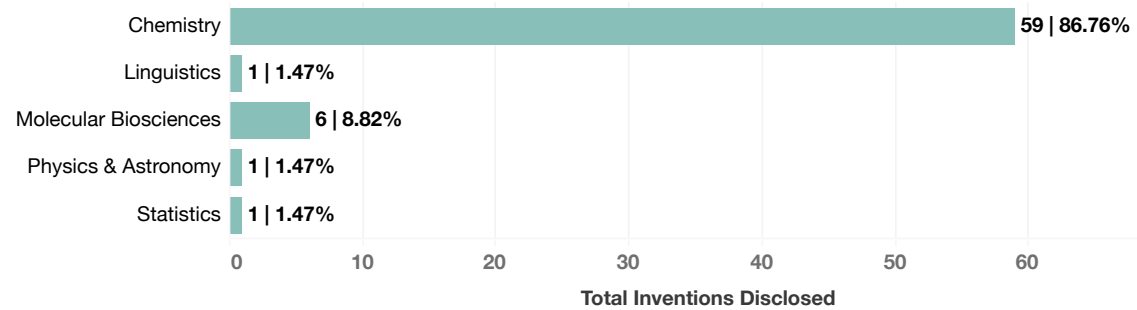


FIG. 7
FEINBERG SCHOOL OF MEDICINE INVENTIONS BY DEPARTMENT

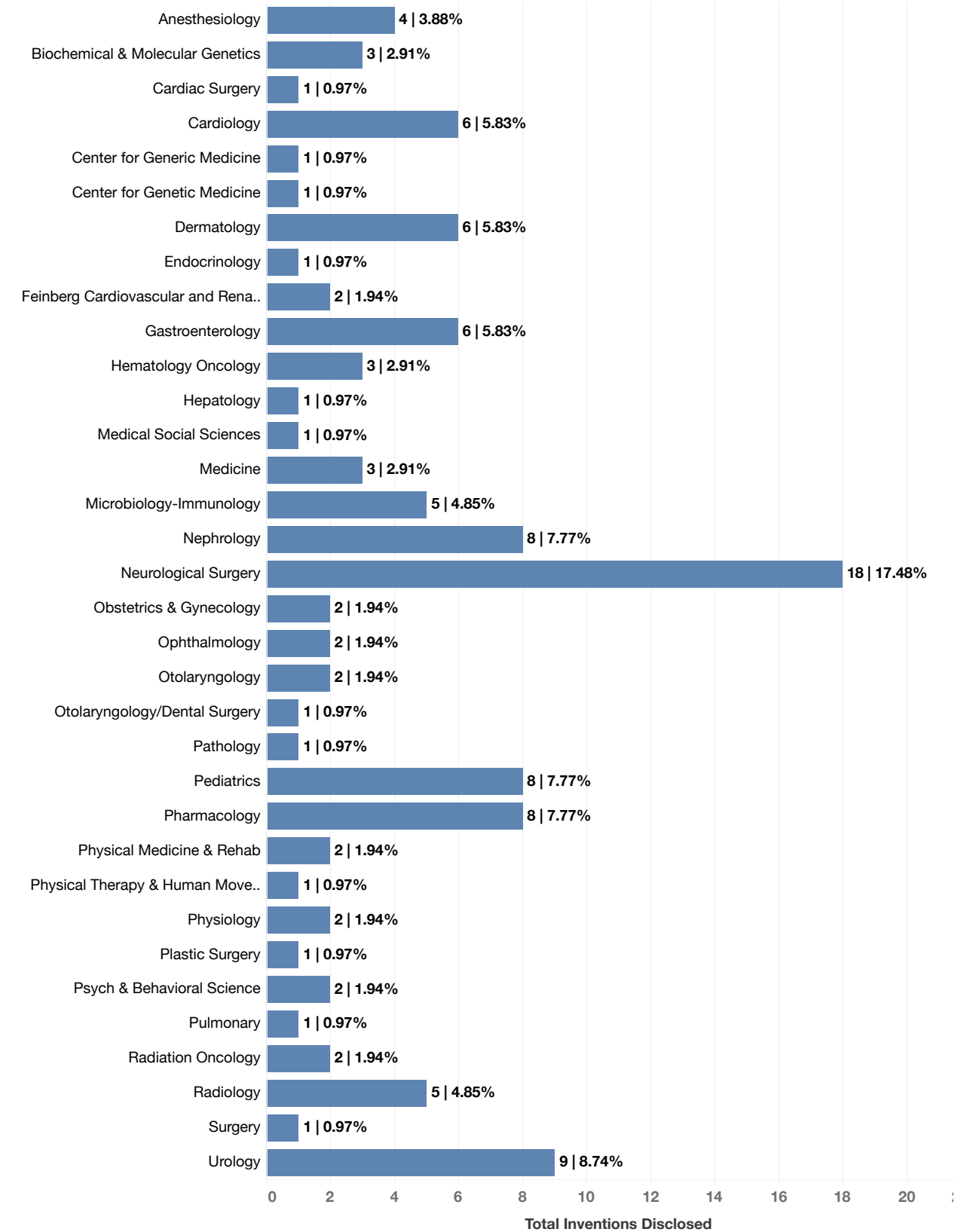


FIG. 8
INVENTORS AMONG TENURED AND TENURE-ELIGIBLE FACULTY

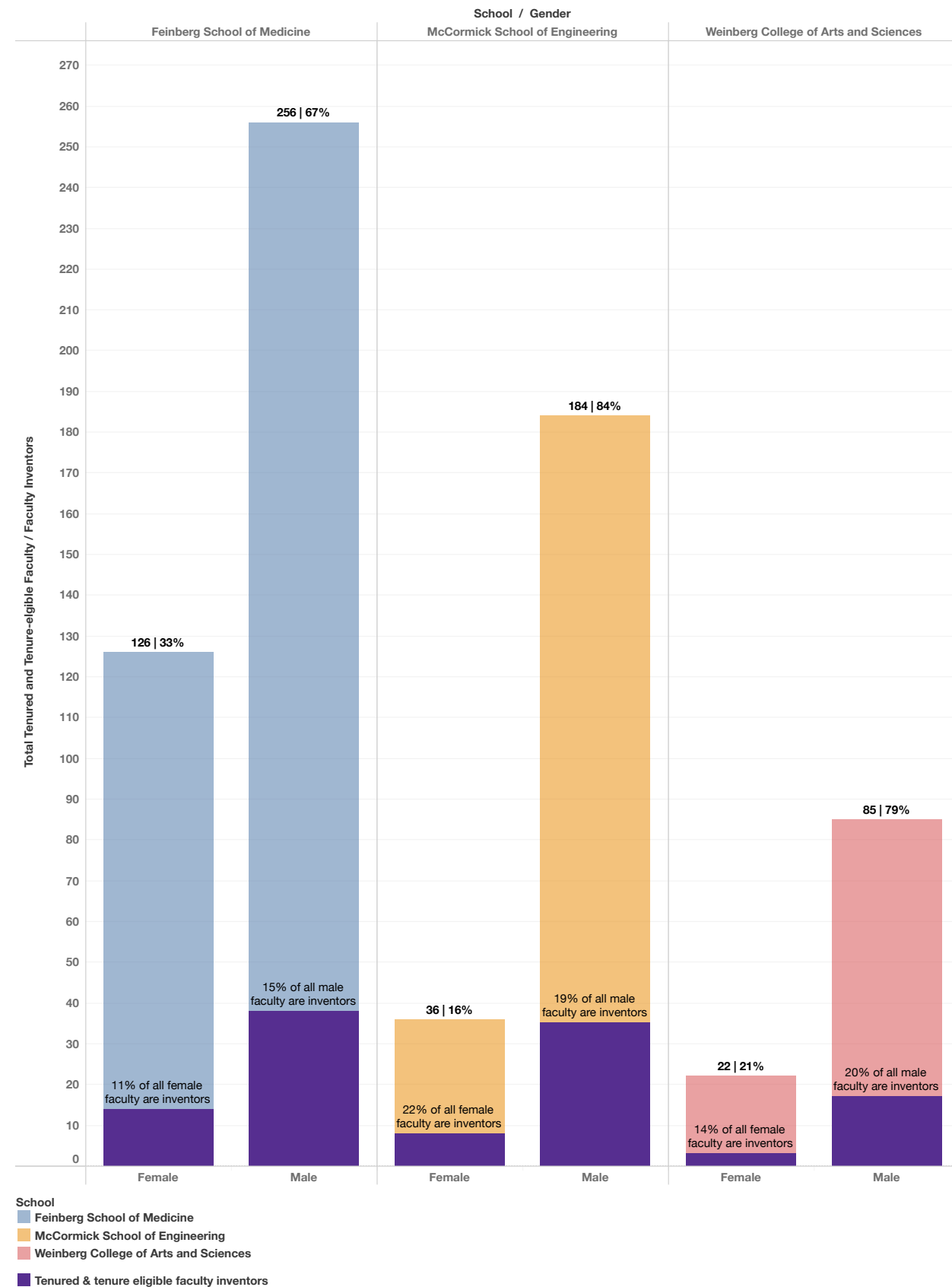


Figure 8 represents the gender distribution of tenured and tenure-eligible faculty and the percentage who disclosed inventions during FY 2020.

Weinberg College of Arts and Sciences percentages represent faculty from the departments of Chemistry, Molecular Biosciences, Physics & Astronomy and Statistics.

As an example, the first bar in Figure 8 shows that 11% of the total female tenured and tenure-eligible faculty at FSM have disclosed inventions during FY 2020.

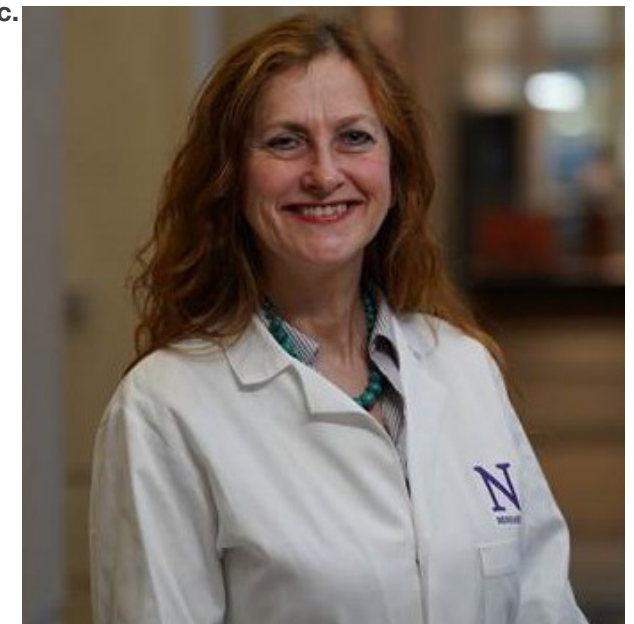
In FY 2020, FSM female tenured and tenure-eligible faculty totals increased by 1% over the previous year. However, FSM female inventorship grew by 57%.

**BY PROMOTING DIVERSITY IN OUR ECOSYSTEM,
THE QUALITY OF OUR INVENTIONS INCREASES**

Dr. I Caroline Le Poole, Temprian Therapeutics Inc.

Vitiligo is an autoimmune disease affecting approximately 50 million people worldwide. It presents itself as progressive white lesions on the skin, especially noticeable in people of color. The condition may lead to complete depigmentation. Comorbidities include amongst others alopecia, a condition that causes hair to fall out in small patches, and hypothyroid disease. While vitiligo manifests itself in the skin, it clearly has an all-encompassing impact on patient life, often leading to discrimination.

Caroline Le Poole, PhD, a professor of dermatology, microbiology and immunology at Northwestern's Feinberg School of Medicine, has developed a DNA-based treatment using the modified heat shock protein HSP70i to reverse disease progression. When applied as a series of needle-free DNA-plasmid injections, the treatment



Prof. I Caroline Le Poole

“Vitiligo is an autoimmune disease affecting approximately 50 million people worldwide. LePoole’s team is working on treatment.”

was shown over a six-month study to reverse the disease in large animals.

Her research, published in journals including *Science Translational Medicine*, show efficacy in animal models. In 2019, Le Poole co-founded the startup company Temprian Therapeutics to take the treatment to clinical trials

with CEO Kettil Cedercreutz. The company is currently in the process of raising \$3 million for preclinical and Phase I/IIa clinical trials.

“It all started by our research team convincing the dermatology world to see [vitiligo] as an autoimmune disease,” she says. “A detailed understanding of the etiology was important for

the development of an effective treatment.”

Le Poole’s doctoral studies at the University of Amsterdam focused on vitiligo etiology. Her dissertation and subsequent research helped her refine approaches to treat both vitiligo and melanoma, where immune responses to affected cells are in fact desirable. By the late 1990s, the Le Poole lab had shown that vitiligo results from T cells attacking and killing the body’s own pigment cells. The process tends to be triggered by severe stress brought on by external factors such as sunburn, other physical trauma, or emotional distress.

“We made a single amino acid substitution that changes HPS70i from activating the immune system, to becoming immunosuppressive, which is what we needed to reverse vitiligo,” she says. With this slight modification of the original molecule, Le Poole gained the ability to alter its function to benefit the patient. Their findings received international attention as a finalist in The Nature Merck 2020 Spinoff Competition. The notice of allowance for the associated patent was given September 18, 2020.

Le Poole believes that her line of research also could have implications for the fight against



Ancy Thomas, PhD, postdoc in Le Poole Lab (left), Dr. I Caroline Le Poole (center), Emilia Dellacecca, MS graduate student Mayo Clinic (right)

melanoma. Besides studying HSP70i, the Le Poole Lab is developing a regulatory T cell-based treatment for vitiligo to target patients with more advanced disease.

Le Poole notes that reserved attitudes towards DNA-based applications have faded in recent years, which has helped spur interest in this type of treatment and underscored the promise that Temprian Therapeutics holds. “When we tell investors about the severity of the disease, the lack of effective solutions, and what our development plans are, investors tend to listen.”

PATENTS

Figure 9 shows patents filed in FY20 per school. Patent filing is consistent with the invention disclosure activity reported in Figure 2. Figure 10 illustrates the breakout of patents filed in FY20. Figure 11 illustrates that issued patents span multiple disciplines and markets.

Patent Types

Provisional patents: Approximately 60% to 70% of all invention disclosures are filed as provisional patents; approximately 50%–60% are converted into non-provisional patents within a year.

Filing a provisional patent application before filing a Utility application presents several advantages:

- Relatively inexpensive and allows the inventor to spend one year gathering more data, resulting in

a stronger patent application

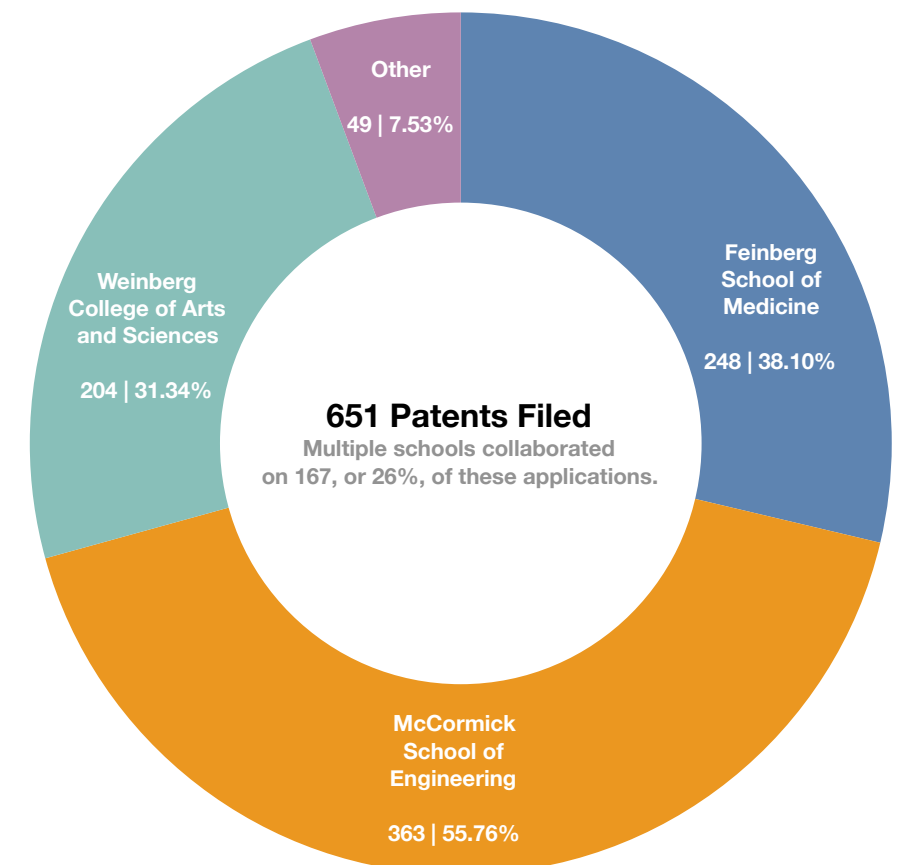
- Allows INVO to conduct a more in-depth commercial assessment of the invention and identification of potential licensees

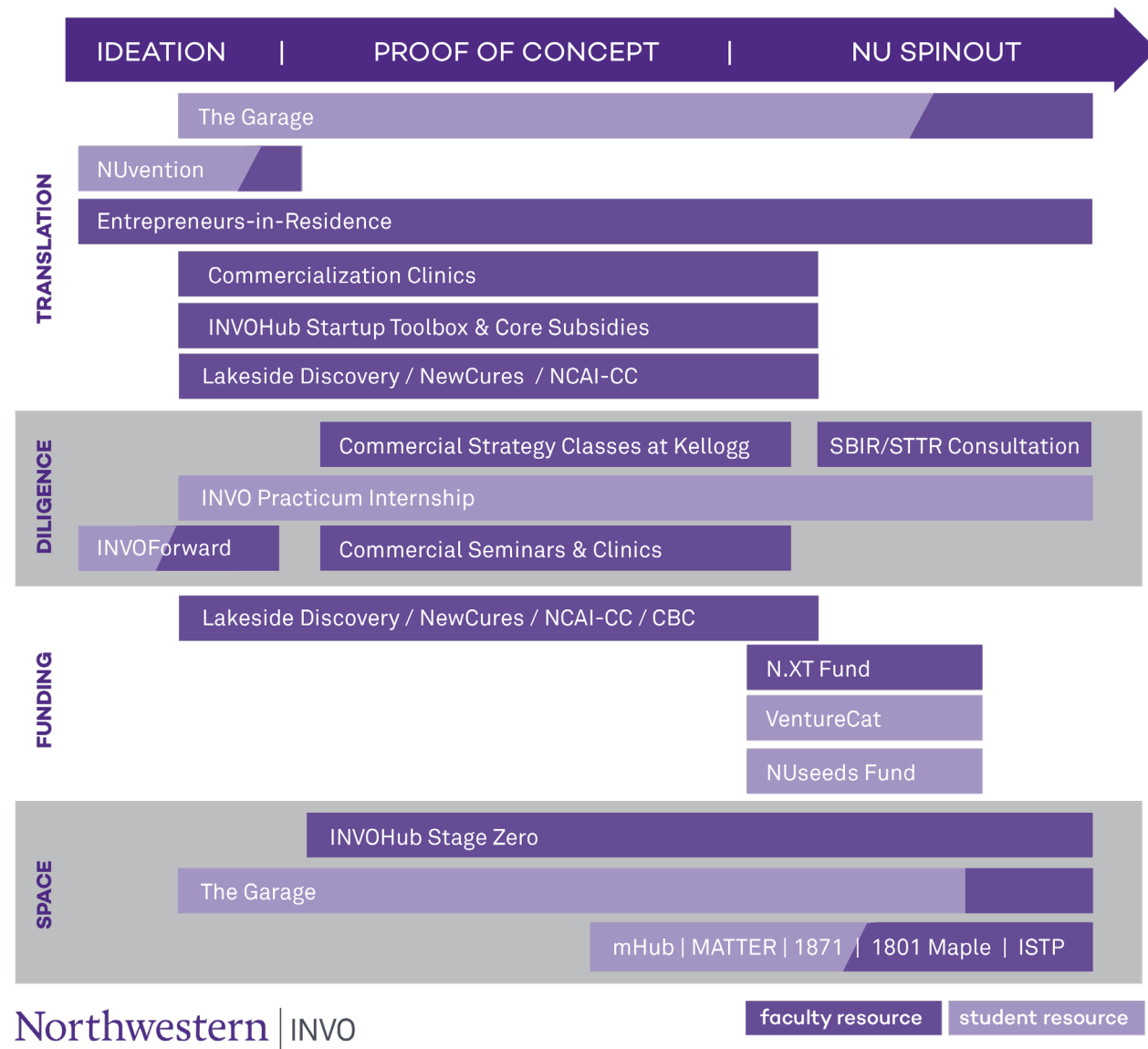
Non-Provisional (Utility) patent applications:

The filing of a Utility patent starts the official examination process with the USPTO to determine if the invention is patentable. The USPTO review of a patent application can take several years.

PCT applications: A PCT is an international treaty with more than 145 Contracting States. The PCT makes it possible to seek patent protection for an invention simultaneously in a large number of countries by filing a single “international” patent. A PCT application must be followed up within 18 months by entering into national or regional

FIG. 9
FILED PATENT APPLICATIONS BY SCHOOL





WE THRIVE AT THE CROSSROADS OF ACADEMIC RIGOR AND ENTREPRENEURSHIP

FIG. 12
FY 2020 STARTUPS BY SCHOOL

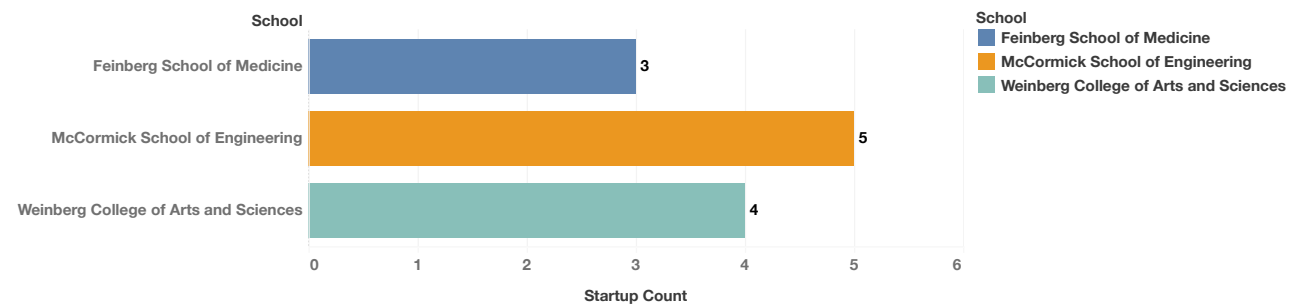


FIG. 13
FY 2020 STARTUPS TIMELINE

September	<p>Vanqua Bio (f/k/a Surmount Bio, Inc.) Prof. Dimitri Krainc\FSM Prof. Richard Silverman\WCAS</p>
October	<p>Wearifi, Inc. Prof. John Rogers\MCC</p>
November	<p>Design Pharmaceuticals Inc. Prof. Michael Jewett\MCC</p> <p>Swiftscale Biologics, Inc. Prof. Michael Jewett\MCC</p>
March	<p>Iris Light Technologies, Inc. Prof. Mark Hersam\MCC</p>
April	<p>Discovery2Innovation LLC Prof. Jonathan Leis\FSM</p> <p>Grove Biopharma, Inc. Prof. Nathan Gianneschi\WCAS</p>
May	<p>Stemloop, Inc. Profs. Julius Lucks & Michael Jewett\MCC</p> <p>Surculus Therapeutics, Inc. Prof. Dalton Surmeier Jr.\FSM Profs. Richard Morimoto & Richard Silverman\WCAS</p>
August	<p>Cardiosense, Inc. Profs. Mozziyar Etemadi & James Heller\FSM</p>

APPENDIX

BIOMARKERS AND BIOMEDICAL RESEARCH TOOLS PIPELINE

■ Available for Licensing

■ Non-Exclusively Licensed/Optioned

■ Exclusively Licensed in Full/Optioned

Phase	Title		Phase	Title		
1-BIOMARKERS	A Genetic Marker for ALS	■	5-ANIMAL MODEL	An 5 - ANIMAL MODEL For Uterine Fibroid Embolization	■	
	A pre-school biomarker for literacy	■		Biobarcode Based on Oligonucleotide-Modified Particles	■	
	Association of Serotonin2c Receptor Polymorphisms with Antipsychotic Drug Response..	■		BMP4 Tg mice: FOP	■	
	Biological Marker For Auditory Processing (Bio-MAP)	■		Clock Tg mice: diabetes	■	
	Biological Markers for Diagnosis of Diseases Associated with Major Depression	■		Dyrk1a conditional knockout mouse	■	
	Biomarker for Colitis	■		Ei-Kras Transgenic, PDEF Knockout Mice	■	
	Biomarker for Early Stage Cancers	■		hSOD1G93A-UeGFP Tg mice: ALS	■	
	Biomarker for Female Egg Quality	■		hTAAR Tg mice	■	
	Biomarkers for Prostate Disease	■		Knockout Mouse Model Of Cognitive Deficits	■	
	Biomarkers for PTSD and Depression	■		MLCK 210 KO mice	■	
	Blood and Biopsy mRNA Expression Signatures to Distinguish Major Causes of Rejection..	■		Mt Clock Tg mice	■	
	Blood biomarker analysis for early detection, treatment response and disease progressi..	■		Mutant Mouse Line C57BL/6J-Fahswingshift	■	
	Cardiac Stress Test with MRI	■		Mutant Mouse Line C57BL/6J-Slc2a4twigg	■	
	Depression and Treatment Response Predictor	■		Nanoparticle Based Biobarcode for the Ultrasensitive Detect	■	
	Detection of antibody reactivity towards deamidated proinsulin for risk prediction and di..	■		PEDF-null Mouse	■	
	Genetic markers in GRB10-DDC region (or 7p12.2) predict Treatment Resistant Schizop..	■		Per2 Luciferase Tg mice	■	
	Lipid Denaturation as a Marker and Therapeutic Target of Ovarian Cancer Stem Cell	■		SOD Tg mice	■	
	Marker for Chronic Pelvic Pain I	■		Transgenic Mouse for Amyloid Pathogenesis	■	
	Marker for Chronic Pelvic Pain Syndrome	■		Triple transgenic mice for triggering inducible hepatocyte apoptosis and uses thereof as ..	■	
	Marker for Neuromuscular Disorders	■		U19 Knockout Mice	■	
	Method for Screening P. Aeruginosa Strains	■		Uchl1-eGFP Tg mice:ALS	■	
	Molecular Signature in the Peripheral Blood for Sub-Clinical Acute Kidney Transplant Re..	■		6-MISCELLANEOUS	3D Transfected Cell Arrays	■
	Neural Biomarkers in Nasal Exhaled Breath	■			3D Transfected Cell Arrays II	■
	Neurodegenerative Disease Biomarkers	■	A Highly Productive One-Pot System for the Incorporation of Non-Standard Amino Acid..		■	
	Perinuclear Compartment as a Cancer Marker	■	A method to create a library of electrophilic compounds for screening using virtual docki..		■	
	Platform-And Sample-Specific Molecular Signatures of Kidney Transplant Rejection	■	Acinetobacter Baumannii Transposon Library		■	
	PNC Cancer Diagnostic (non-breast cancer)	■	An Elevated-Pressure, Freeze-Thaw Method For Liposome Gas Encapsulation		■	
	PTSD Blood Test	■	Antibody to Microtubule Associated Protein Tau; Clone Tau-7		■	
	RBFOX1/A2BP1 and related proteins as drug targets for treatment of psychiatric disord..	■	At Home Menopause Test		■	
	Small Molecule Antiviral Therapy	■	Cell-free glycoprotein synthesis (CFGpS) in prokaryotic cell		■	
	Tracking Reporter Gene	■	Cell-free protein synthesis driven metabolic engineering (CFPS-ME)		■	
	Use of Maspin as an Anti-ROS Scavenger Against Cell Proliferation, Inflammation, and ..	■	Cell-Free Yeast Protein Synthesis		■	
	UTI Management	■	Detergent-free membrane solubilization		■	
	2-NUCLEIC ACID	A Universal Phosphoramidite For The Preparaton Of Tosylated	■		Development of an Ex Vivo Female Reproductive Tract in a 3D Microphysiologic Setting	■
		Clock gene cDNA	■		Effective Mucosal Blood Vessel Size and Oxygenated Hemoglobin Concentration in the ..	■
		hsp70.1 pr-luc Plasmid	■		Elastic Backscattering Spectroscopic Microscopy	■
		Nuclear Lamins Expression Vector	■		Enucleation of Feeder Cells and Egg Cells	■
		pAN1: ElectroTfm of Clostridium	■		Ex Vivo Female Reproductive System	■
		pHT plasmids	■		Faster and more efficient two step sequence specific nucleic acid capture	■
		Timeless gene cDNA	■		Female Fertility Test	■
	3-ANTIBODY	alpha 3 laminin, mouse	■		Fluorescent Sensors for Zinc	■
		alpha 4 laminin, mouse	■		Glycosylated ligands for exosome targeting	■
		Anti-ALP1 Antibody	■		High Throughput Transcription Profiling	■
		Anti-macrophage monoclonal antibodies (CD31, CD87, CD15)	■		Hydraulically Actuated Patch Clamp Electrode System	■
		Antibody for Tubulointerstitial Nephritis	■		Integrated microfluidic tissue culture system for use with female reproductive tissues	■
		BRAP Antibody	■		Irreversible inhibitors of Nedd4-1 polyubiquitination	■
		CD 13 antibody mouse	■		Lamin B1: Marker for Replicative Senescence	■
gamma 3 laminin, mouse		■	Making Tethered Ribosomes		■	
Hard-Tip Active Spring Lithography		■	Mechanism-Based Small Molecule Cross-Linkers of HECT E3 Ubiquitin Ligase - Substr..	■		
Hemidesmosome (BP180) mouse		■	Method for Making Ribosomes	■		
Hemidesmosomes (BP230) mouse		■	Method of in vitro ribosome synthesis and evolution	■		
HSF1 and HSF2 antibodies, rat		■	Methods for Activating Natural Energy Metabolism for Improving Yeast Cell-Free Protein..	■		
HSP-70 antibodies mouse		■	Methods for Improved in vitro Protein Synthesis with Proteins Containing Non Standard ..	■		
hu Tau C-term, mouse		■	Nanocytological and Molecular Analysis of Fecal Colonocytes for Colon Cancer Screeni..	■		
Importin beta1, mouse		■	Nanopatterned Extracellular Matrices Enable Cell-Based Assays with a Mass Spectrom..	■		
Influenza M2 protein, mouse		■	Neuronal cell line with suppressed endogenous sodium current	■		
Lamin A and C antibodies, rb		■	Non-toxic cell staining probe	■		
Metabolic Antibody Discovery and Development		■	Novel Photocrosslinking Reagents to Map Protein Protein Interfaces in Vitro	■		
Molecular Control over Exosomes for Isolation, Quantificatio		■	Planar Two Dimensional Biofilm Reactor for Flow-Field-Based	■		
mHSP-70, BIP/grp 78 mouse		■	Preclinical Model of Multiple Sclerosis	■		
PGSL-1, mouse		■	Proof of Concept of Engineering a Yeast Receptor to Detect New Peptide Ligands	■		
rat laminin -332 alpha3 subunit, mouse		■	Proteasome adaptors - degradons	■		
Scarpulla Lab Antibodies - 6 Antibodies		■	Raman Spectroscopy for Anthrax Detection	■		
Tau Isoforms, mouse		■	Reverse Transfection Technique	■		
Tau N Terminus, mouse		■	Scaffolds for Artificial Ovary	■		
Tau Tyr18 nitrosylated, mouse		■	Scalable Cell Sorting via Motility	■		
TNT1: Tau PAD region, mouse		■	Transcription Factor Analysis: Transfected Cell Array	■		
TOC-1 mouse antibody		■	Two gRNA method for homologous recombination-based gene targeting	■		
Vascular endothelial cell Ag, m		■	UbiFlu-Novel Class of Fluorescent Probes to Screen for Inhibitors/Activators of HECT E..	■		
4-CELL LINE		E. coli from human prostate	■	Yeast-Free Protein Synthesis & By-product Removal	■	
		HSV-2 333/Gal and HSV-1 KOS/tk12	■			
		MM.1 Myeloma cell lines	■			
		Retinal Muller Cell line	■			
	S.cerevisiae H4S47C	■				

HEALTHCARE DEVICES, TOOLS & IT PIPELINE

■ Available for Licensing
 ■ Non-Exclusively Licensed/Optioned
 ■ Exclusively Licensed in Full/Optioned

Phase	Title	Phase	Title		
1-CONCEPT	3D printed Intraocular lens	2-LABORATORY PROTOTYPE	Mobile Opioid Dosing simulator		
	3D Printing of Endovascular Stents		MRE Passive Driver		
	A Novel Medical Device that Differentiates Stroke from Acute		Multimodal T1-T2 MRI Contrast Agents		
	Adjustable Banding Device for AVF		Nanofabricated Glucose Sensor [SWCNT Glucose Monitor]		
	Agility Trainer		Naso-Seal Device		
	Ambulatory blood pressure Device		NICU2HOME smartphone application		
	Analysis of Multiplexed Bead-Based Assays		Non-Contact Liquid Droplet Manipulation Method		
	Cartilage Coupled PeptidePolymers		Normalization of MRI for Imaging of Gene Expression Signatur		
	Catheter for Gene Therapy		Novel Chalco-Halides for Imaging		
	Central Dialysis Catheter with Balloon Technique to Prevent		Optical and Acoustic Imaging		
	Heart Valve Repair Rings, with Sizers and Holders, which All		Optical Coherence Photoacoustic Microscopy		
	Hemodialysis Needle with a Safety Tip		Parylene membranes for drug delivery		
	Imaging & Therapeutic Nanoconjugates		Peptide Conjugated MRI Contrast Agent		
	Impedance planimetry for Assessment of Cervical Ripening dur		Perovskites for gamma-ray detection		
	iPSC-EC Performance Enhancement Via SIRT1 Overexpression		pH Responsive Self-Healing Hydrogels		
	Left Atrial Appendage Occluder Device		Photoluminescent Panthenol Citrate Biomaterials with Antioxi		
	Method to measure Perfusion and Leakage Parameters in a Sing		Point of Care Diagnostic Tool		
	Nanostructures for Alzheimer's Diagnosis		Printing 4D Composite Scaffolds for Bone Generation		
	Real Time and High Resolution Spatial Mapping of Kidney Filtr		Prosthetic Foot with an Adjustable Flat Region		
	Retrievable scaffolds for beta cell replacement therapies		Protein-Based Contrast Agents for MRI		
	Scar-Free Tissue Regeneration		Resorbable Wireless Bone Stimulator		
	Sealants for Fetal Membrane Repair		Soft Materials for Bioprinting		
	Self Assembled Bioadhesives		Soluble Membrane Protein Libraries in Nanodiscs		
	Simultaneous covalent and non-covalent polymerizations for h		Spatiotemporal Background Phase Correction for Phase Contras		
	Synthetic antigen compositions for detecting antiphosphatidy		Spectroscopic Super-resolution Microscopy		
	2-LABORATORY PROTOTYPE		A Biological Marker for Concussion	3-COMMERCIAL PROTOTYPE	Stroke Rehabilitation System
			A Heavy Metal Blood Collection Card for Screening Newborns and Children		Structured Illumination Microscopy
			A Universal Method for Fabricating Complex Metallic Structur		Supramolecular Glycosaminoglycans
			Abnormal Scar Identification with Spherical Nucleic Acids Te		Targeted therapy for the prevention of restenosis in the car
			Adaptable Ankle Foot Prosthesis		Technique for disaggregating & estimating Electronic Health
			Advanced retinal blood flow measurement		The Hidden Markov Spike Generator for Cochlear Implants
			Aligned Nanofibers for Nerve Regeneration		The LaserNanoPump (LNP)
			App for Movement Disorders		Thermoresponsive Cell Adhesive Bioresorbable Dressing
			Bedside Pulse Lavage Project Modifications		Triple Balloon Catheter
			Biodegradable Drug Delivery [Drug Releasing Tubes for Tissue Engineering]		Virtual Electrophysiologic Testing For Cardiac Arrhythmia Ri
			Biomimetic High Density Lipoprotein Nanoparticles as Catalyt		Wearable for Ambulatory Blood Pressure Monitoring
			Cardiac Tissue Ablation		3D Suture
			Chalco-Halides for Medical Imaging [Materials for X-Ray & Gamma Ray Detection]		A "Skin-like" Wearable Sensors for Sweat Loss Analysis
			Collagen Binding Heparin for Anti-thrombosis and Re-endothel		A Fluorometric Assay to Measure Cholesterol Binding Kinetics
Colorectal Cancer Screening Device		Annuloplasty Ring Sizer			
CsPbX3: Perovskites for gamma-ray detection applications		Anthrax Detection			
Device for Isolating an Analyte from a Sample		Auditory Test			
Digitally Adjustable Phrenic Nerve (DAPhNe) Stimulator		Automated fMRI for Clinic			
DNA Intercalators with Duplex-Selective Luminescence Enhacem		Bioscaffolds for Replacement Ovaries			
DOPA Nanoparticles for Diagnosis and Therapy		Brain Wave Processing to Enhance Sleep			
Electronic Biochip System		Cell Therapy for Diabetes			
Electrostatically triggered partially denatured albumin hydr		Circumferentially Constructive Annuloplasty Ring			
Extracellular Matrix Protein-Coated Scaffolds Promote The Re		Diaphragm-based Hybrid Prosthetic Vacuum Pump for Transfemoral Amputees..			
Extracellular Matrix With Anticoagulant Properties for Tissue Engineering		Evaluating Impact of Oxidative Stress on AF Electrograms			
First In Vivo Surface-Enhanced Raman Glucose Sensor		Flexible Electronic Medical Device			
Gel Scaffolds of BMP-2-Binding Peptide Amphiphile Nanofibers		Gas Sensor for Smart Chest Tube Drainage			
Heavy Metals in Dried Blood Spots		Hybrid Prosthetic Vacuum Pump for Transfemoral Amputees			
High Precision Diagnosis of ADHD Based on Functional Neuroim		Implantable Biomedical Sensors			
High Throughput Partial Wave Spectroscopic Microscopy		Liquid Cast Biodegradable Drug Delivering Arterial Stent			
Hybrid Prosthetic Leg		Method for Detecting and Quantifying a Target Molecule in a			
Hydrogels for improved tissue graft survival		MRI-Perfusion and Diffusion Mismatch			
Implanted Surgical Film for the Reduction of Post Surgical Complications		Nanodiamond Conjugates			
Intrinsic-contrast super-resolution optical microscope		Neonatal Abdominal Surgery Trainer			
iSOCT		Particles For Detecting Intracellular Targets			
IVC Filter Removal		Partition Layer for Raman Nanobiosensor			
Left Ventricular Apex Surgical Technology		Photodetector for Infared Imaging			
Lipid Nanoparticles for Measuring Chronic and Acute Response		Point of Care Diagnostics			
Low Power Cochlear Implant		Quantification of Cerebral Perfusion			
Lung-inspired microfluidic platelet bioreactor		Radio Frequency Soft Tissue Ablation System			
Macromolecular MRI Contrast Agents	Raman Biosensor for Multianalyte Detection				
Materials that Promote Bone Regeneration	RF Ablation Probe				
Method For Preparing High Aspect Ratio Peptide Amphiphile Fibers	Robust Semi-Automated Pulse Wave Velocity Estimation From 4D				
Method for the Mapping and Quantification of In-vivo Blood F	Room Temperature Synthesis and 3D-Printing of Bioactive *Ela				
Method, system, and apparatus of metabolic optical coherence	SNR Improvements for Multi-Slice MRI				
Microfluidic platelet bioreactor	Thin, Soft, Skin-Mounted Microfluidic Networks with Capillar				
	Virtual Electrophysiologic Test				
	Vocal Cord Medialization				
	4-HUMAN TESTING				
	AF Electrogram Analytics Software				
	Atrial Fibrillation Diagnostic Software				
	Bedside Wound Pulse Lavage				

HEALTHCARE DEVICES, TOOLS & IT PIPELINE (CONT)

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Phase	Title	
4-HUMAN TESTING	Bi-Modal Ankle-Foot Systems for Standing and Walking	
	CA Diagnostic with Microscopy	
	Endoscopic CA Diagnostic	
	Equilibrium-Point Prosthetic And Orthotic Ankle-Foot Devices	
	Hearing Aid Interface	
	HIV Diagnostics	
	Improved methods of neurological assessment with thermoregul	
	Improvements to Passive Ankle-foot Prosthesis Capable of Aut	
	Medical Adhesives	
	Method and User Interface for Hearing Aid Control	
	Polymers for Vascular Disease	
	Pre-Free Colon CA Screening	
	Rehabilitation Robotics	
	5-APPROVAL & MARKETING	Childress Ankle
		Esophageal Panometry
		IntelliCare: Mobile apps for depression and anxiety
Panometry		
Point of Care Protein Diagnostics		
Robotic Arm for Orthopedic Surgery		
Sticky Flare		
Surgical Cement Mixer Apparatus		

THERAPEUTICS PIPELINE

Available for Licensing

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Phase	Title	Phase	Title		
1-NEW TARGETS	Adoptive Cell Therapy using SNAs	2-HIT TO LEAD	Noise based coding in cochlear implants		
	Antibiotic-Coated Nanoparticles		Novel RNA Therapeutic Candidate for Fibrotic Diseases		
	Compositions and Methods for the diagnosis of major depressive disorder		Nylon-3-copolymers as Functional Mimics of Lung Surfactant P		
	Conjugation of Peptides to SNAs Using Traceless Linkers		p38MAPK Modulators of CNS Pathology and Cognition		
	CXCR4 Modulators		p50 Compound		
	Engineering Nucleotide Sequence or Composition to Promote En		p53 Reactivators: Cancer		
	Facile synthesis of micellar spherical nucleic acids using t		Peptide-Oligonucleotide Chimeras (POCs) as Programmable Biom		
	Female Fertility Treatment		Peptides for PEDF		
	FGF23 Normalizing Methods		Peptides: Cancer		
	Gene Therapy: Anti-Depression		Plaque Digestion: Cardiovascular		
	HDL-like Nanoparticles: Infection		Protein Folding		
	HDL-NP-NO (CV)		S.epidermidis Lipotechoic Acid (SELTA) for immune modulation		
	Hydrogel Wound Dressing With Cu Ions		Self-Management of Abnormal Scars via Transdermal Delivery o		
	Immunotherapy: Macular Degeneration		Small molecule disruption of the Super Elongation Complex an		
	Kinase Inhibitors: Cancer		Small Molecules against ALS		
	Lipophilic nanoparticles for drug delivery		Soft Materials for Bioprinting		
	MAPK Compounds: CNS Disorders		Sonic hedgehog regulation of human rhabdosphincter muscle: P		
	MLCK Inhibitors		Statin for Hearing Loss Prevention & Therapy		
	Nanopatterning for Controlling Cell Cytoskeleton		Stem Cell Signaling Molecules for Cancer Therapies		
	Nanostructures for Medulloblastoma and other CNS cancers		Substituted pyrazoles as MYC targeting agents		
	Nitric Oxide Releasing High Density Lipoprotein-like Nanoparticles		Substituted Pyrrolo[2,3-d]pyrimidines for the Treatment of C		
	Poly (Lactic-co-Glycolic Acid) (PLGA) Spherical Nucleic Acid		Targeted therapy to stop hemorrhage		
	Pro-Drugs: Streptococcus		TGFb Inhibitor Transgene		
	PTPRD as drug target for treatment of schizophrenia and othe		The application of myosin 9 family members and Slit-Robo-Myo		
	Pulmonary intravascular non-classical monocytes mediate lung		Therapeutic targeting of MLL1 proteolytic cleavage by taspas		
	Scar-Free Tissue Regeneration		Treating Prader-Willi Syndrome and Seizure Disorders		
	Screen for Covalent Drugs		Triggered Release Arsenic: Cancer		
	Self-manageable Abnormal Scar Treatment with Spherical Nucle		Urinary Tract Infection Vaccine		
	Sirt1 Gene Therapy For Improved Wound Healing		Use of 2-(4-acetoxypheyl)-2-Chloro-N-Methyl-Ethylammonium C		
	Sirtuin Inhibitors		Use of REDD1 inhibitors (regulated in development and DNA da		
	Spherical Nucleic Acids with Sheddable PEG Layers		Use of Self-Assembling Peptide Amphiphiles to Prevent Tumor		
	Structure-Function Relationships in the Development of Immun		2-Aminopyridine Based Selective Neuronal Nitric Oxide Synth		
	Thermoresponsive Adhesive Dressing		2-Aminoquinolines as Novel, Potent, and Selective Inhibitors		
	Tricyclic carbogenic molecules as anticancer agents		9-ING-41-Cancer		
	2-HIT TO LEAD		A bacterial toxin that is a Ras specific protease	3-LEAD OPTIMIZATION	A vehicle to introduce selected bacteria to the skin, scalp,
			A Concise Route to the Chiral Pyrrolidine Core for Inhibitor		Alzheimer Immunotherapy
			A new CNS-available formulation HDACi for management of chro		Amino-alkoxyester-linked peptides having anti-angiogenic and
			A Novel 5-HT5A Receptor Antagonist for Treatment of Psychiat		Aminopyridine Dimer Compounds, Compositions and Related Meth
			A novel treatment of sleep-wake disorders by consuming modif		An Improved Synthesis of Novel Pyrrolidine Inhibitors of Neu
			AMP Analogs-Cell Proliferative Disorders		Anti-angiogenic peptides and their esters for treating cance
			AMPA Receptor Antagonists: Neurologic Diseases		Anti-Inflammatory Nanomolecules for Tissue Regeneration
			Antibacterials		Antibody and variants thereof for inhibiting Nodal-dependent
			Application of Honokiol in Anti-Ototoxicity and Hearing Prot		Arsenolipins for Cancer Treatment
			Aptamer-Loaded, Biocompatible Nanoconstructs for Nuclear-Tar		Arylazanylpyrazolone Inhibition of Mutant SOD1 Mediated Cyto
			Aromatic heterocycles Inhibitors of Mnk1 and 2		b lactamase Inhibitors: Antibiotics
Bladder Regeneration		Bacterial NOS Inhibitors as Antibiotics			
Bone Marrow Mesenchymal Stem Cells with CD34+ Hematopoietic		Cancer Treatment with phospholipid particles containing a cy			
CD154 Trimer Stabilization: Immunity		Carbohydrate Enhanced Nanoparticles for Immune Modulation			
Chromatin Therapy to Sensitize CA Cells		Combination Therapy for Cardiac Arrhythmias			
Composition and Method for Preventing or Treating a Tauopath		Combination Therapy for Treatment of Cancer			
Composition and Use of PLGA-PEG/PEI nanoparticles		Combinations of NMDAR Modulating Compounds			
Compositions and Methods for Treating Alzheimer's Disease		Development of GLUT4 Selective Inhibitors for Cancer Therapy			
Compositions and Methods to Reduce Inflammatory Responses		Exosomes: Cholesterol Modulation			
Compositions Comprising Epigenetic Modifying Agents and Meth		GABA Aminotransferase Inactivator for the Treatment of Addiction and Hepatocellular C..			
Compounds: Neurologic Disorders		Gaucher's Disease (Glucocerebrosidase)			
Dentin Matrix Protein 1 Ameliorates Chronic Kidney Disease b		Gene Silencing Enhancers			
Enantioselective conjugate additions of amines		Gene Therapy: Atrial Fibrillation			
Epstein-Barr Virus Inhibitors		Glucocerebrosidase Modulators			
FFAR2 Agonists: Type 2 Diabetes		GLUT Antagonists Cancer 2			
G Protein Inhibitors: Cardiovascular		GLUT Antagonists: Cancer 1			
HIV Therapeutics		Hepatic Cell-Mediated Cardioprotection in Ischemic Injury			
Immunotherapy for Treating Age-Related Macular Degeneration		Herpes Virus Vaccine and Oncolytic Vectors			
Inhibition of Mast Cell Function as a Therapeutic for Chroni		High density lipoprotein functionalized magnetic nanostructu			
Inhibitors Of The Mevalonate Pathway Of Streptococcus Pneumo		Inactivators of Toxoplasma gondii Ornithine Aminotransferase			
Intramolecular Hydrogen Bonding: A Strategy to Bioavailable		Inhibiting Cancer Cell Motility			
Ion Channel Manipulation: Parkinson's		Inhibitors for Triple Negative Breast Cancer			
Iron Chelator as a Treatment for Cardiomyopathy, Heart Failu		Inhibitors: Leukemia			
Maspin: Bone Disorders		Kinase Inhibitors			
Megakaryocytic Leukemia Treatment		Liposomal Statin Formulation			
Megamolecule Synthetic Antibodies		Liposome Coated Nanostructures			
Method for the Preparation and Characterization of DNA-Iron		Liposomes for Bioactive Gas Delivery and Methodology			
Methods of Treating Brain Disorders or Identifying Biomarker		Magnetic-Lipid Nanocapsule (MLNC)- A novel nanoconstruct for			
Methods of Using (1S,3S)-3-amino-4-difluoromethyl-1-cycl		Malaria Prophylaxis			
Methods to Reduce Polyposis and Colorectal Cancer		Maspin Protein Mimics for Cancer Treatment			
Molecules to Treat Inflammation		Metarrestin-Akzhimers, Drug Tolerance			
Nanodiamond-Mediated Delivery of Water-Insoluble Therapeutic		Method for the synthesis of heterooyhimbine natural products			
Nanomolecules for the Treatment of Inflammatory Bowel Diseas		Method Of Using Mitotically Inactivated Embryonic Stem Cells			

THERAPEUTICS PIPELINE (CONT)

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Phase	Title	Phase	Title		
3-LEAD OPTIMIZATION	MW-150-Alzheimers (p38 kinase)	4-PRE-CLINICAL DEVELOPMENT	Tau Monoclonal Antibodies		
	Nanoparticulate Arsenic Platinum Drugs		Templated Spherical High Density Lipoprotein Nanoparticles		
	Neurodegenerative Disease Therapy		Topical Wound Treatment		
	Neuroprotective Therapeutics		Antisense Molecules for Wound Healing		
	Novel autophagy-inducing small molecule ML246 as a treatment		AST-005 -Psoriasis TNF		
	Peptide Amphiphiles for Neurite Outgrowth		AST-008- Tumors (Chkpoint inhibitor)		
	Potential treatment of corneal vascularization		Controlling Immune Response using the Polyvalent Nanoarchite		
	Preparation of Pyrimidine-2,4,6,-trione Derivatives and Thei		Detection, Discovery and Therapeutic Methods in Insulin Production		
	Programmable Polypeptide for siRNA and Nucleic Acid Delivery		Gene Regulation with NP-Nucleic Acid		
	Pyrimidine and fused pyrimidine compounds as 8-glucocerebros		Gene Regulations with Polyvalent siRNA-Nanoparticle Conjugates		
	Pyrrolopyrimidine compounds and their applications		GLYX-13: Depression and Pain		
	RNA-directed DNA Cleavage & Gene Editing		Gold Nanoparticles for Templated Nanomaterials		
	RNAi Inhibitor: Haem Peroxidase (bundled, take this box off pipeline)		Gold Nanoparticles For Therapeutics		
	Scaffold Delivery of Antigen-Specific Suppressor Cells for C		Inhalable and Intranasal Formulations of Neuroactive Peptide		
	Selective Neuronal Nitric Oxide Synthase Inhibitors with Azo		Lead Compounds For Neurodegeneration and Neuroinflammation		
	Self-Assembling Gel System For Treatment Of Myocardial Infar		Locked Nucleic Acid-Nanoparticle Conjugates		
	Small Molecules: Parkinson's Disease		Method to Control Dopaminergic Neuron Pacemaking		
	Substituted fused pyrrolo-diazepinones and uses thereof		Methods of Depression		
	Targeting of Nanoparticles with the Antibody ATN-291		Methods of Identifying Compounds for Treating Depression and Other Related Diseases		
	Targeting Stem Cell Signaling Molecules for New Cancer Inter		Methods of Treating Conditions using Azetidione Compounds		
	Thiophene-2-carboximidamide Based Selective Neuronal Nitric		Methods of Treating or Ameliorating Migraine		
	TLR4 Inhibitors for Scleroderma Therapy		Modulating Uptake of Oligonucleotide-modified Nanoparticles		
	Use of ECDI-fixed Cell Tolerance as a Method for Preventing		Multifunctional Peptide And oligonucleotide Nanoparticles For Gene Regulation		
	Use Of Stem Cell Factor Alone Or In Combination With GCSF To		Multiple Sclerosis Therapy		
	Using toxic RNAi active sequences embedded in genes in the h		Nanoparticle Conjugates as Anti-Glioma Therapeutics		
	Using Triplet Repeat siRNAs to Selectively Kill Cancer Cells		Nanoparticles For Control Of Drugs		
	4-PRE-CLINICAL DEVELOPMENT		3crx98-Metastasis	5-CLINICAL TRIALS	NMDA Receptor Agonists and Uses Thereof
			A General Method for Achieving Nucleic Acid-Nanoparticle Con		NYX2925- Pain Traumatic Brain Injury
			Biocompatible Infinite Coordination Polymer Nanoparticle-Nucleic Acid Conjugates		NYX-783-CNS
			Biomimetic High Density Lipoprotein Nanoparticles to Control		NYX-xxx-CNS
			Bladder Regeneration		Oligonucleotide Gold Nanoparticles for mRNA Regulation and D
			Chronic pelvic pain vaccine		Oligonucleotide Specific Uptake of Nanoconjugates
			Compositions and Methods for Antigen-Specific Tolerance		Organ Transplantation
			Crosslinked Nucleic Acid Live Cell Diagnostics and Therapeut		Secondary Structure Stabilized NMDA Receptor Modulators
			Defining the Alloreactive T Cell Repertoire Using High-Throu		Small Molecules for Tourettes Syndrome
Display of affinity domain-based targeting proteins		Templated Hollow Phospholipid			
DNA-directed assembly of protein crystals from protein/DNA core-shell nanoparticles		Templated Oligonucleotide Nanoparticles			
E. Coli Isolated from Human Prostate		Treatment of Depressive Disorders			
Enhancing the stability and immunomodulatory activity of lip		Treatment of Neuropathic Pain			
Flavanones & Chromanones: Cancer		XCUR17-Psoriasis IL-17RA			
GABA Analogues: Hepatocellular Cancer		6-APPROVAL 7-PLATFORM	Lyrica: Fibromyalgia		
Glycosides for Cancer			A Modular Extracellular Sensor Architecture for Cell-Based B		
Heparin-Binding Peptide Amphiphile for Cardiac Conditions			Enhanced Gene Expression for Gene Therapy Applications		
Heteroaromatic Selective Inhibitors Of Neuronal Nitric Oxide			Exosome Targeting		
Human Melanoma			Inducible Cysteine Protease Autoprocessing of Recombinant Pr		
Inflammation Modulator			Membrane Coatings pH Sensitive Anticancer Drug Delivery		
Inhaled formulation of small molecule inhibitor of Wnt/beta--catenin			Nano-devices for local drug delivery, which are immobilized		
Inhibition of Bacterial Transcription by Polyvalent Oligionu			Stem Cell Therapy to Generate Cholinergic Neurons		
Liposomal Particles, Methods of Making Same and Uses Thereof					
Medical Food					
Metarrestin-Metastasis (autophagy)					
Mixed Monolayer Gold Nanoparticles for Cancer Therapeutics					
Nanoparticle Supported Lipid Bi-Layer Bio-Mimetic Structures					
Nitric Oxide Synthase Inhibitors					
NOS Portfolio Inhibitors					
NOS Targeting: Neurodegeneration					
Novel autophagy-inducing natural compound Rg2 as a treatment					
Nucleic Acid-lipoprotein Nanoparticles for Therapeutic Use					
Numonafide: Cancer Therapy					
Oligonucleotide Loading on Silver Nanoparticles					
Peptide Conjugated Particles					
peptide vaccine for lupus					
Peptide-coupled Carboxylate-Surface-Functionalized Biodegrad					
Peptide-coupled Nanoparticles to Treat Autoimmune Disease, Transplant Rejection & All..					
Peptides: Immune tolerance					
Potent and Selective Neuronal Nitric Oxide Synthase Inhibito					
Preventing Scar Formation					
Preventing UTI Symptoms					
Protein/oligonucleotide core-shell nanoparticle therapeutics					
Scaffolds for nNOS Inhibition					
Self-Assembling Nanovirus					
Sensitization to Steroids					
Small Molecules against Hepatocellular Carcinoma					
Small Molecules CNS					
Subacute Administration of NMDA Modulators Alone or in Combination					
Synthesis of Spherical Nucleic Acids via Self-Assembly of Nu					

ENERGY & SUSTAINABILITY PIPELINE

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Phase	Title	
1-RESEARCH	Catalytic Methane to Ethylene Conversion over Mixed Oxide-Su	■
	Deriving hydrogen from bioalcohols in water without producin	■
	Doped SnSe single crystals: ultralow thermal conductivity an	■
	Doped Tin Selenium Single Crystals	■
	PAH Scavenger System (ExBox)	■
	Photocatalyst	■
	Photocatalytic Composite	■
	Protective cathode coatings for lithium-ion batteries	■
	Tin-Based 'Perovskites' for Solar Cell Production	■
	2-RESEARCH VALIDATION	Algorithm for Electric Charging Station Placement
All-Carbon Counter Electrode		■
Carbon Nanoparticle for Energy Storage		■
Conjugated Polymers and their use in Optoelectronic Devices		■
Crumpled Graphene Coated Si Nanoparticles		■
Epoxidation of Unsaturated Hydrocarbons		■
Functional monolithic polymeric organic framework for ag capture		■
Graphitized Li-Ion Batteries		■
Integrated Solid Oxide Fuel Cells		■
Lead-Free Solar Cells		■
Methane/Nat Gas-Powered SOFC		■
Nanocomposites for Energy Storage		■
New Column Technology for the Efficient Capture of Heavy Met		■
New Ion Exchange Column Technology for Removal of Cr(VI) and		■
Novel Batteries for Medical Devices		■
Organic Photovoltaics w/Nickel Oxide		■
Polymeric Organic Frameworks		■
SMOFC Battery Cathode		■
Solar Cell Coating		■
Solid Oxide Fuel Cells		■
Solid State Solar Cell		■
Solution-Processed High Mobility Inorganic Thin-Film Transis		■
Stretchable Batteries with Self-Similar Serpentine Interconn		■
Synthesis of Layered Metal Sulfide Ion-Exchangers	■	
Synthesis of Porous Amorphous Metal Sulfide Ion Exchangers	■	
Water Detoxification Method	■	
3-COMMERCIAL VALIDATION	Carbon Nanotubes for Photocatalysis	■
	Electrode Material Composed of Graphene-Composite Materials	■
	GLi ion exchange materials from brines and seawater	■
	Gold Isolation Method	■
	Heavy Metal Removal and Gas Separation (title on Fbox: cost-effective chalcogenide po..	■
	Material Composed of Graphite Network Formed from Reconstit	■
	Polymeric Blends Formed by Solid-State Shear Pulverization	■
	Reactively Sputtered TiO2 Nanocomposite Thin Films for Photo	■
	Removal of Heavy Metal and Radioactive Pollutants from Water	■
	Si Nanoparticles for Rechargeable Lithium Batteries	■

ENGINEERING & TECHNOLOGY PIPELINE

■ Available for Licensing
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Phase	Title		
1-RESEARCH	All-Carbon Spin Logic	■	
	Bipolar Magnetic Junction	■	
	Computing Logic Family	■	
	Design and Simulation of a Snapshot Multi Focal Interferomet	■	
	Dielectrostrictive sensors for shear stress measurement, pro	■	
	Emitter-Coupled Spin Transistor Logic	■	
	Gate Tunable Nanoscale Memristors	■	
	High-Speed Magnetic Memory Device	■	
	Integrated On-Chip Thermocouple Array	■	
	ISOLATION OF PHOSPHORENE AND RELATED AMBIENT-REACTIVE NANOMA	■	
	Magnetic Diode Based Programmable Logic	■	
	Molecular Quantum Interference and Electronic Devices	■	
	Monolithically Widely Tunable Quantum Cascade Lasers Based o	■	
	Neighbor Discovery in Wireless Networks via Compressed Sensi	■	
	New Class of Molecular Iodosalts for Use in Next Generation Solar Cells	■	
	Noncentrosymmetric Metal Electrodes for Ferroic Devices	■	
	Novel Logic Family w/Nanowire Transistors	■	
	Novel Protective Polymers for Circuitry	■	
	Organic Ferroelectronics	■	
	Spin-Diode Logic Family	■	
	Transverse Thermoelectrics	■	
	Two Qubit Gate	■	
	Ultralow Power Carbon Nanotube Logic Circuits	■	
	2-RESEARCH VALIDATION	Antiambipolar Heterojunctions from Semiconductors	■
		Atomic Force Electroluminescence Microscopy	■
		AutoLum: Precise Automatic Camera and Display Calibration AI	■
		Bridge Enhanced Nanoscale Impedance Microscopy	■
		Broad Frequency Electric Field Sensor	■
		Contactless Probe for Detecting Buried Conducting Layers	■
		Deducing Charge Density Gradients in Doped Semiconductors	■
Design Techniques for Area and Energy Efficient Time Domain		■	
Direct Conversion of Infrared Images with High Conversion Ga		■	
Gate tunable p-n heterojunction diode		■	
High Speed/Low Dose Multi-Objective Autonomous Scanning Materials Imaging		■	
Improved Nonlinear Optic Glassy Fiber and Thin Film		■	
Magnetic Field Sensors		■	
Novel Separator for Electricity Storage Devices		■	
Portable cell-free molecular sensing platform		■	
Silver Cathode for Lithium Batteries		■	
Synthesis of borophenes		■	
TEM Nanostructure Characterization Device		■	
Tracking Circuit for Hardware Security and Reconfiguration		■	
Two Dimensional Assembly of Graphite Oxide Single Layers, an		■	
WIFM		■	
Wireless Devices for Virtual Reality Applications		■	
Zirconium-Oxide Tunnel Barriers		■	
3-COMMERCIAL VALIDATION	3D Printing of Nanocomposites	■	
	Barium Titanate Waveguides	■	
	Hot Pressing Method for Transistors	■	
	Hybrid Thin-Film Transistors	■	
	Low Voltage Organic Electro-optics	■	
	Metal Oxide Thin Films	■	
	Organic Semiconductors	■	
	Organic Transparent Electrodes	■	
	Planar Photonic Jet Lens for Small Spot-Size and Large Field View	■	
	Printable Dielectrics for Electronic Devices	■	
	Single-Molecule Protein Arrays Enabled by Scanning Probe Blo	■	
	Stretchable Si Integrated Circuits	■	
	Thiophene-based materials for optoelectronics	■	
	Transparent Conducting Graphene-Silica Thin Films	■	
	Wireless Skin Hydration Sensor with Methods and Uses	■	
	4-MARKET	Electrostatic Multitouch Haptic Display	■

MATERIALS & INDUSTRIAL PROCESSES PIPELINE

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Phase	Title		
1-RESEARCH	An Organo-Lewis Acid as Cocatalyst for Cationic Homogeneous	■	
	CxPbX3: perovskites for gamma-ray detection applications	■	
	Ductile Magnesium Alloys	■	
	Gradient Spray Coating Polymer Pen Arrays	■	
	High Temperature Steel for Steam Turbine Applications	■	
	In Situ Photocatalytic and Thermocatalytic Activities	■	
	Novel X-Ray and γ-Ray Detector Material	■	
	Oil Soluble Organo-Silver Additives as High-Temperature Addi	■	
	Photonic Crystal Built with Nanoparticles and Spacer Groups	■	
	Polysulfide compounds for environmental remediation	■	
	Production of Substituted Imidazole Molecules	■	
	Silica Poymer Pen Lithography	■	
	Synthesis of 2-Aryl Indoles	■	
	Synthesis of Privileged 7-Membered Ring Molecules	■	
	2-RESEARCH VALIDATION	2D Nanomaterial Sorting	■
		A Universal Method for Production and 3D-Printing of High-Pa	■
		Adhesive Hydrogels for Surgery	■
		An Automated Toolpath Generation Method for Double Sided Inc	■
		Anti-microbial hydrogel coatings	■
		Arrays for X-Ray Optics Lamination	■
		Atomic Force Photovoltaic Microscopy	■
		Biocompatible Hydrogels	■
		Compression and Aggregation-resistant Particles of Crumpled	■
		DOPA-Melanin Films	■
		Efficient Thin-Film Synthesis	■
		Electro-Optic Modulator	■
		Encapsulation of Single Walled Carbon Nanotubes Via Self-Ass	■
Enhanced Strength Cement Composites		■	
Extra Strength Magnesium Alloys		■	
Extra-Strength Hydrogel Adhesives		■	
Flash Reduction of Graphitic Oxide to Graphene		■	
Fluorescent Imaging of Graphene-based Materials		■	
Gas-Phase Deposition in MOF		■	
Graphene Concentration Method		■	
Graphene-Titania Nanocomposite Photocatalysts		■	
High Accuracy Double-Sided Incremental Forming		■	
High Energy Density Nanocomposites		■	
Hole Array Films		■	
Hydrogel Wound Dressing With Controlled Ion Release Properties		■	
Imaging for Steroid		■	
Isolation of single-walled nanotubes		■	
Laser-Assisted Oxide Nanopatterning		■	
Laser-Induced Plasma Micromachining (LIPMM)		■	
Low-Cost Semiconducting Single-Walled Nanotubes		■	
Magnetic Shape-Memory Foam		■	
Maskless Nano-Patterning		■	
Mesoscale Metallic Pyramids With Nanoscale Tips		■	
Method for Fabricating Soft and Hard Lunar, Martian, and Add		■	
Micro Drug Delivery Device		■	
Multi-layer 2D perovskites for solar cell applications		■	
Multifunctional Nanocomposites		■	
Nano Fountain Pen		■	
Nanodiamond Particle Complexes		■	
Nanoparticle Sorting Method; Improved Nanoparticle Processing for Energy Use		■	
Nanoscale Doping for Transparent Conducting Oxides		■	
Nanoscale Self-Assembling Organic Dielectrics		■	
Nanoscale Subsurface Imaging		■	
Nitrogen-Free Plant Polyphenol Derived Coatings		■	
Novel MOF based on Azolium Salts		■	
Novel Synthetic Route to Diazaperopyrenium Dication and the		■	
p-type Transparent Conductors		■	
PbTe Composite Material for Thermoelectric Devices	■		
Plant Polyphenol Coatings & Methods	■		
Polycrystal Memory Foam for Energy Applications	■		
Programmable Soft Lithography: Solvent-Assisted Nanoscale E	■		
PTAuCu nanocatalyst for electrochemical hydrogen evolution	■		
Route to Diazaperopyrenium Dication	■		
Self-Assembled Monolayer Mediated Silica Coating Of Silver N	■		
Self-assembly of Oligo Amphiphiles	■		

Phase	Title		
2-RESEARCH VALIDATION	Single Photon Detectors & Imagers	■	
	Stress Manipulated Coating for Figure Reshape of Optics Mirrors	■	
	Substrate-Independent Anticoagulant and Antibacterial Coatings	■	
	Synthesis of Uniform Gold Nanoparticles through Reductive Gr	■	
	Thickness Sorting of 2D Nanomaterials	■	
	Tri-Pyramid Robot	■	
	Water Processable Graphene Oxide	■	
	Whisker Sensor	■	
	Zinc Sensor for MRI	■	
	3-COMMERCIAL VALIDATION	A Novel Poly (Diol-Co-Citrate) Hydroxyapatite Composite For Clinical Fixation De..	■
		Additive Manufacturing At Phase Boundaries	■
		Adhesive Polymer Coating	■
		Aluminum Superalloys for Use in High Temperature Application	■
		CD-MOFs for Storage of Active Ingredients	■
		Ceramic Composite	■
		CNT Reinforced Cement	■
		Conductive Tin and Zinc-Doped Thin Films	■
Controlling Charge Injection in OLEDs		■	
Crosslinkable Polymer Dielectrics		■	
Electron-Blocking Layer For Improved Organic Photovoltaics		■	
Enumerative Generator of Hypothetical Metal-Organic Framework		■	
Fabrication of Metal Composite Thin Films		■	
Gas-absorbing Metal Organic Frameworks		■	
Global Thermal Control of Additive Manufacturing		■	
Graphene Oxide Paper		■	
Graphite Nanoplatelet Dispersion		■	
Improved Power Conversion For Organic Photovoltaics		■	
Intense Pulsed Light Annealing of Graphene Inks		■	
Interfacial Shear-Flow Additive Manufacturing		■	
Kinetic Separation of Olefin/Paraffin with MOF		■	
Majority Graphene 3D-Printed Composites		■	
METHOD AND APPARATUS FOR DOUBLE-SIDED INCREMENTAL FLANGING		■	
Method of Epitaxial Growth of MgO		■	
Method to Improve Paint Production with Titanium Oxide		■	
Micro-surface Texturing System		■	
Micro-Textured Surfaces		■	
Monolithic, Multi-Component Solid Oxide Fuel Cells from Mult		■	
Multifunctional Bio-Inspired Coating Method For Modification		■	
Nanocomposite Film and Paper Production	■		
Nanoporous Materials	■		
Nanotube Reinforced Cement	■		
Novel Materials for Polymer Light Emitting Diodes	■		
Novel Ni-Based Alloys	■		
Novel Organic Self-Assembled Nanodielectrics	■		
Novel Solid Organic Host Silicon Matrix Polymer	■		
Nucleic Acid-Metal Organic Framework (MOF) Nanoparticle Conj	■		
Organic Photovoltaic Cells	■		
Organic Semiconductor Materials	■		
Proximity Sensor Based on Cantilever	■		
Purification Of Carbon Nanotubes By Electronic Structure Via	■		
Semi-conducting Nanotubes	■		
Sequestration and Detection of Carbon Dioxide with a Metal O	■		
Sequestration and Detection of Harmful Chemicals in a Nanopo	■		
Silole-Containing Polymers	■		
Superlattice Dielectrics	■		
Transparent Nanowire Transistors	■		
Unconventional Electro-optic Chromophores	■		
4-MARKET	Advanced Materials	■	
	Graphene Ink for Gravure Printing	■	
	Graphene Ink for Screen Printing	■	
	High Conductivity Graphene Inks	■	
	Solid-State Shear Pulverization of Neat Polyesters Yielding	■	

SOFTWARE & SERVICES PIPELINE

■ Available for Licensing
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 ■ Exclusively Licensed in Full/Optioned

Phase	Title		
1-RESEARCH	Method and Apparatus for Physical and Medium Access Control	■	
	Olfactory based virtual reality with sub-second timescale co	■	
2-RESEARCH VALIDATION	A Method for Acquiring Intentionally Limited Data and the Ma	■	
	Efficient Incremental Algorithm for Minimum Area Retiming	■	
	Fourier-domain Mobility Spectrum Analysis (FMSA)	■	
	Ichef	■	
	Low cost sensing and communication system for rotorcraft	■	
	Mint (Materials Interface)	■	
	Net Theater: Dynamically Constructing Theatrical Experience	■	
	Novel Logic Encryption Designs for IC Protection	■	
	Private Data Networks: Federated Databases for Mutually Dist	■	
	Radio Resource Management in Large Wireless Networks	■	
	Street-Level IP Geolocation Technology	■	
	System and method for multi user two-way ranging	■	
	Top Down Proteomics Software Libraries	■	
	User-Driven Indoor Visibility Localization with Wayfinding	■	
	VirtualCar: Computational simulation of self-propelling auto	■	
	3-COMMERCIAL VALIDATION	6DoS (Six-degrees-of-separation)	■
		A method for speeding the learning of equalization parameter	■
		AutoCog: Measuring Description-to-permission Fidelity in And	■
		Central Line Insertion Training Curriculum	■
		Equalization Preference Learning Algorithm	■
Finding Trending Topics on Social Media		■	
MAT2C: A MATLAB-to-C Translator		■	
Motorized Software: Controlled Calibrator		■	
Northwestern Anagram Test (NAT)		■	
Northwestern Assessment of Verb Inflection (NAVI)		■	
Northwestern Assessment of Verbs & Sentences (NAVS)		■	
Northwestern Naming Battery (NNB)		■	
Real-Time Patient Volume Predictor Instrument		■	
REPET (REpeating Pattern Extraction Technique)		■	
SAFE (Situational Awareness for Events): A Data Visualizatio		■	
Sequential Action Control		■	
Simulation-based Mastery Learning for Peripherally Inserted		■	
Simulation-based Mastery Learning for Ultrasound Guided Peri		■	
Social Media-Based Preference Determination and Recommendati		■	
The Digital Loft		■	
Treatment of Underlying Forms (TUF)		■	
Twitter Profiling/Mindshare		■	
Uranine: Real-time Privacy Leakage Detection and Prevention		■	
4-MARKET		A Method to Search Audio Synthesizers Using Vocal Imitation	■
		Administrative Network Manager	■
		Advanced Encryption System	■
		Algorithm to Produce High Performance Steel & Alloys	■
	AppShield: A Proxy-based Data Access Mechanism in Enterprise	■	
	Artificial Intelligence & Writing	■	
	bioXroute: a Scalable Trustless Blockchain Distribution Network	■	
	Chematica	■	
	Digital Language Lab	■	
	Integrated Scheduling Software	■	
	Marketing Algorithm Based on Social Media	■	
Optimization Software	■		

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