INVO
INVENTIVE ACTIVITY
FY 2017

Northwestern | INVO

INNOVATION AND NEW VENTURES

Cover images: *(Left) Extending Neural Cell Technology: False Colored, Scanning Electron Microscope; Creator: Mark McClendon and Zaida Alvarez, Stupp Lab; Simpson Querrey Institute for BioNanotechnology*

(Middle) 3D Painted Copper, Technology: 3D Painted Material; Creator: Adam Jakus, Shah Lab; Simpson Querrey Institute for BioNanotechnology

(Right) Biosensing device created by Epicore Biosystems, a startup using Prof. John Rogers' technology to create soft microfluidics devices that harvest and route sweat from skin pores

DEAR MEMBERS OF THE NORTHWESTERN COMMUNITY,

Across our institution—in every school, in every department, and in dorm rooms—something wonderful, rich, and inspiring is happening. Spurred by creativity and a problem-solving mindset that shines in our campuses' classrooms and labs, Northwestern has established itself as one of the globe's fastest-growing incubators of ideas and innovations.

This, of course, is no accident. As a University, we promote intellectual curiosity, encourage diversity of thought, and challenge our community—faculty and students alike—to be daring, visionary thinkers. Innovations and entrepreneurship, then, are the inevitable byproducts, particularly given the motivation and intellectual capital that blankets our community. INVO stands at the nexus of this web, maintaining a clear, tenacious vision to bring innovations to society that amplify Northwestern's voice in global discussions and drive its impact in the world.

In FY17, INVO helped Northwestern secure another record year of inventive activity. Since last year the number of inventions grew 4%, executed agreements on inventions increased by 21%, filed patents increased by 8% and issued patents soared by 42%.

Yet more, we broadened and strengthened our entrepreneurial ecosystem with new programs such as the NewCures accelerator, INVOForward, and Stage Zero. Alongside other upstart efforts such as The Garage, NUseeds, and N.XT, we are building capacity, nurturing ambitious projects, and bringing ideas to market. We continue to support the circular nature of research, promoting entrepreneurship and scholarly strength simultaneously while maintaining an unrelenting focus on the integrity of our academic culture.

At INVO, we will continue to champion a decentralized approach, one that sparks random collisions and advances our innovation pipeline. To that end, we are implementing a new system that will allow schools, departments, centers, and individual faculty across the University to mine their own invention data. We remain committed to continuous improvement and believe this new system will help us better identify and prioritize opportunities. It is the next step in our evolution, but far from the only step, and honors our belief that intellectual diversification coupled with strategic partnerships powers game-changing solutions.

Moving forward, our uncompromising work will continue. We will champion innovation. We will expand our ecosystem. We will push ideas to the public. And we will help build a stronger Northwestern and a better world.

Alicia Löffler
Executive Director, INVO
Associate Provost, Innovation and New Ventures
Associate Vice President for Research

WE WILL CHAMPION INNOVATION. WE WILL EXPAND OUR ECOSYSTEM. WE WILL PUSH IDEAS TO THE PUBLIC.

211
INVENTIONS DISCLOSED

529
PATENT APPLICATIONS

210
AGREEMENTS EXECUTED

7.5
MILLION IN LICENSING REVENUES, DOLLARS

185
PATENTS ISSUED

12
STARTUPS

NORTHWESTERN INVENTIVE ACTIVITY CONTINUED TO GROW

Figure 1 illustrates invention disclosure activity since 2002. In FY17, INVO processed 211 invention disclosures, slightly higher than the FY16 level (203). In FY16, INVO, through The Garage, began providing invention waivers to students before they disclose. This change in process was established to reduce the administrative burden on the INVO office.

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).

Inventions span many disciplines and markets. Figure 3 shows the distribution of inventions by category. Healthcare Devices, Tools and IT 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.

Figure 1. Invention disclosures, 2002–2017

Figure 2. Inventions by school

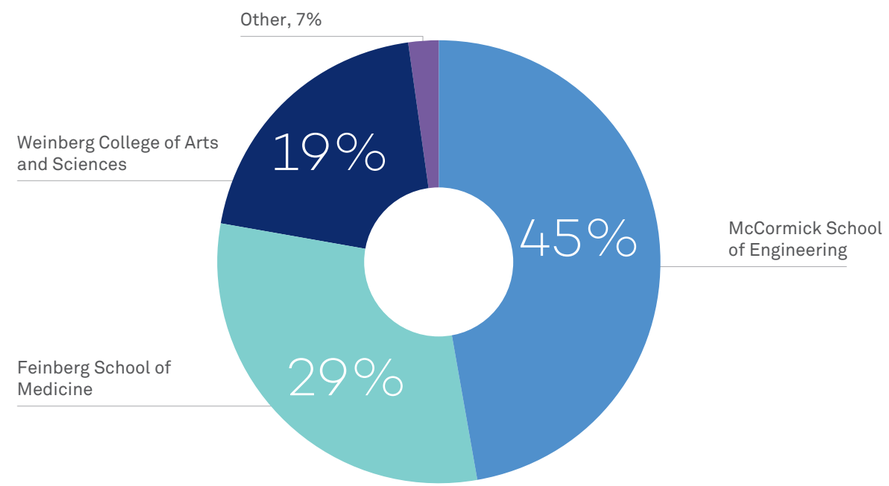
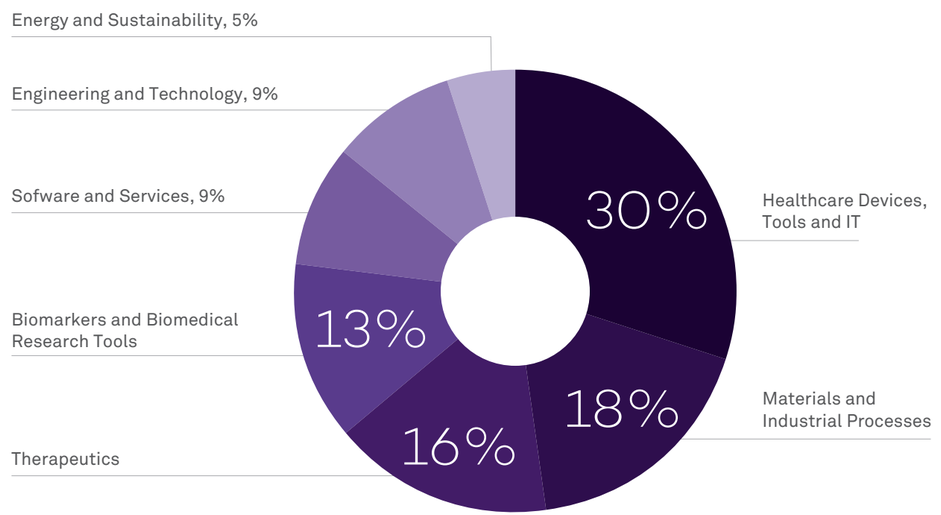


Figure 3. Inventions by category



"Our mission is to get Northwestern research and technologies from the lab and into the public space and to accomplish that we continue to strengthen our infrastructure with a variety of different and distinct mechanisms that help entrepreneurs turn their research into real-world applications."—Lisa Dhar, INVO Director of New Business Ventures for Engineering

INNOVATIVE TECHNOLOGIES NEVER SPRINT from the lab to the real world. From computer software to electronics, medical devices to nanotechnology, commercialization requires research, market validation, testing, and plenty more to reach the public's hands—an arduous, complex, and necessary journey.

Over the last year, INVO has unveiled a series of new programs designed to "add value" to University-based innovations and drive marketplace debuts:

NewCures
Best characterized by Lyrica and Naurex, Northwestern claims a rich history of bringing therapeutic technologies to market. The NewCures accelerator program builds upon this legacy, helping scientists translate their fundamental research into "industry-ready" compounds positioned to enter pre-clinical development and attract investment. NewCures joins the recently established N.XT fund in strengthening the funding ecosystem for advancing Northwestern research to commercialization.

INVOForward
Modeled after the National Science Foundation's I-Corps program, INVOForward aims to accelerate biomedical commercialization—medical devices, therapeutics, and health IT—by supporting entrepreneurs in the customer discovery process. This year, the INVOForward, a cohort of seven faculty teams focused on medical devices, has begun working with subject matter experts on assessing market need, defining prospective customers, overcoming regulatory hurdles, and building a sound financial framework.

Stage Zero Resources
Established to increase Northwestern's pipeline of research-based startups, INVO's Stage Zero program helps early-stage ventures conquer commercialization's common pain points. Through different components of the program, the University provides subsidies for a portion of startup costs in critical areas such as law and finance, subsidies for use of University Core Facilities, and access to space on campus. Seven startups are part of the first year cohort of Stage Zero companies including:

CycloPure: Developed first ever adsorption technologies that capture and remove toxic chemicals and making systems that can be used in industries and treatment facilities to make water safe. *Prof. Will Dichtel*

Epicore Biosystems: Creating soft microfluidics devices in the form of flexible, stick-on patches that measure biomarkers present in sweat for health status determination. *Prof. John Rogers*

Integrated Protein Technologies (IPT): Advancing protein measurement technologies for use in pharmaceutical development and medical diagnostics. *Prof. Neil Kelleher*

Microbial Pharmaceuticals: Utilizing an advanced genomics and analytical chemistry platform to mine microorganisms for novel chemical substances. *Prof. Neil Kelleher*

StarSight: Developing 3D vision systems for consumer electronics and robotics markets. *Prof. Hooman Mohseni*

TERA-print: Providing instruments and services to rapidly prototype nanostructured devices for research or commercial purposes. *Prof. Chad Mirkin*

Third Coast Therapeutics: Developing orally active small molecules to stop the spread of cancer. *Prof. Karl Scheidt*

Regulatory Support
To bring a medical device to market, entrepreneurs must clear various regulatory hurdles. INVO streamlines commercialization by helping entrepreneurs address the inevitable regulatory questions that will arise, including offering targeted advice on preparing an application package for the U.S. Food and Drug Administration.

Karl A. Scheidt (left), Weinberg College of Arts & Sciences Professor; Executive Director, NewCures; Director, Northwestern Center for Molecular Innovation and Drug Discovery (CMIDD).

COLLABORATION IS ONE OF THE PILLARS OF HIGH QUALITY INVENTIONS

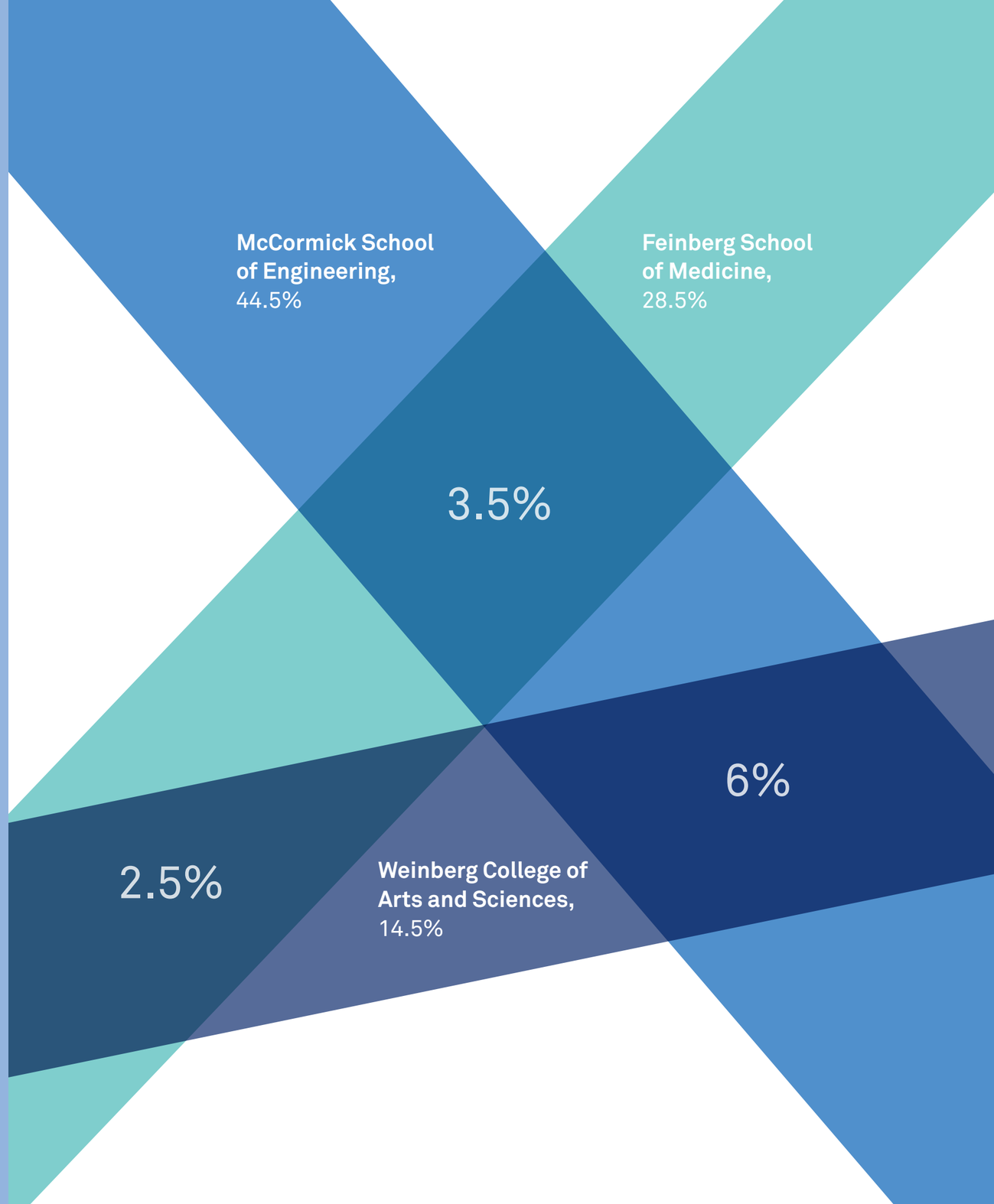


FIGURE 4. As a University, we promote intellectual curiosity, encourage diversity of thought, and challenge our community—faculty and students alike—to be daring, visionary thinkers.

WE CONTINUE TO PROMOTE ENTREPRENEURSHIP AND SCHOLARLY STRENGTH SIMULTANEOUSLY

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

Figure 5. McCormick School of Engineering inventions by department

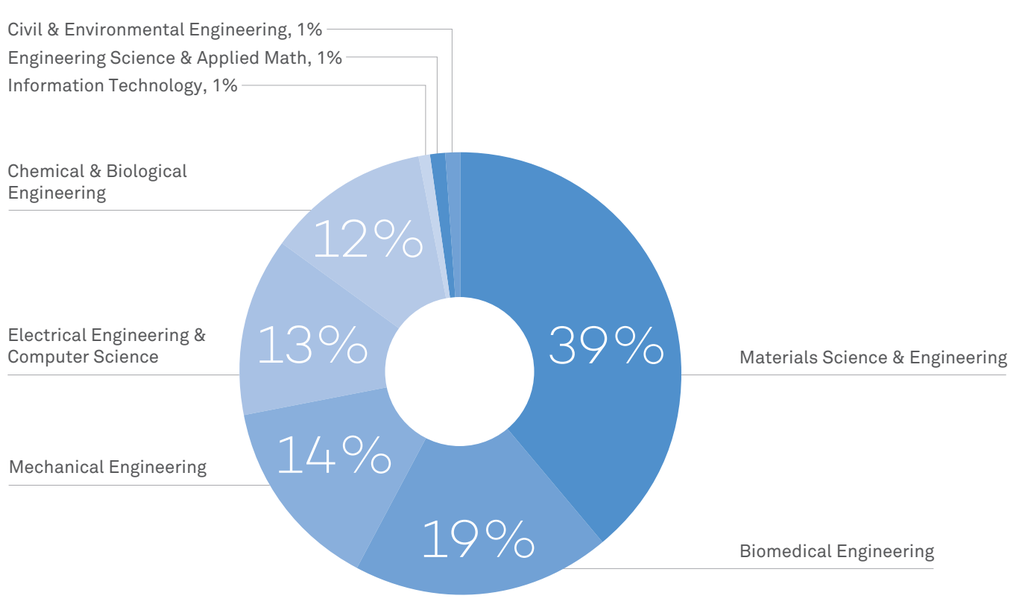


Figure 6. Feinberg School of Medicine inventions by department

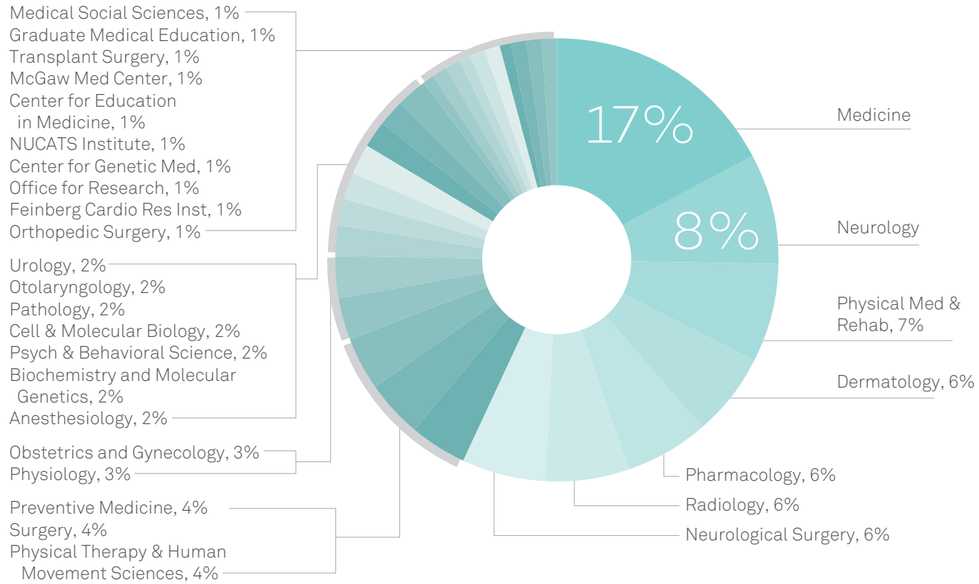
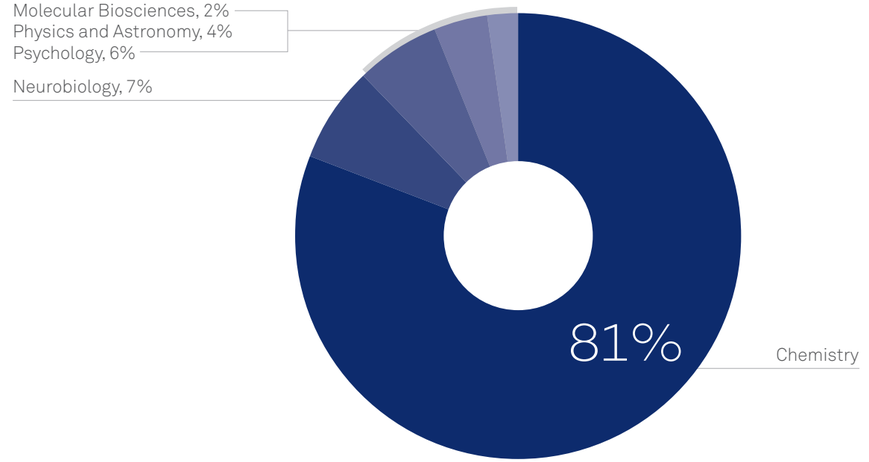


Figure 7. Weinberg College of Arts and Sciences inventions by department



FROM HIS FIRST DAYS as a Northwestern undergraduate in 2015, Lucas Philips knew he wanted to launch a company. With the help of The Garage, Northwestern's two-year-old, on-campus innovation hub for students, Philips accomplished his objective.

With access to mentors, a professional workspace, and a collaborative peer environment, Philips built BrewBike into a viable business that now employs 30 team members and provides Northwestern community members their daily caffeine fix from a pair of retail locations: a mobile, four-wheeled quad—the aptly named BrewBike—and an Annenberg Hall kiosk.

Philips' entrepreneurial adventure with BrewBike continues to pull him from his comfort zone, challenging him to grow, learn, and develop new skills he knows will prove invaluable throughout life.

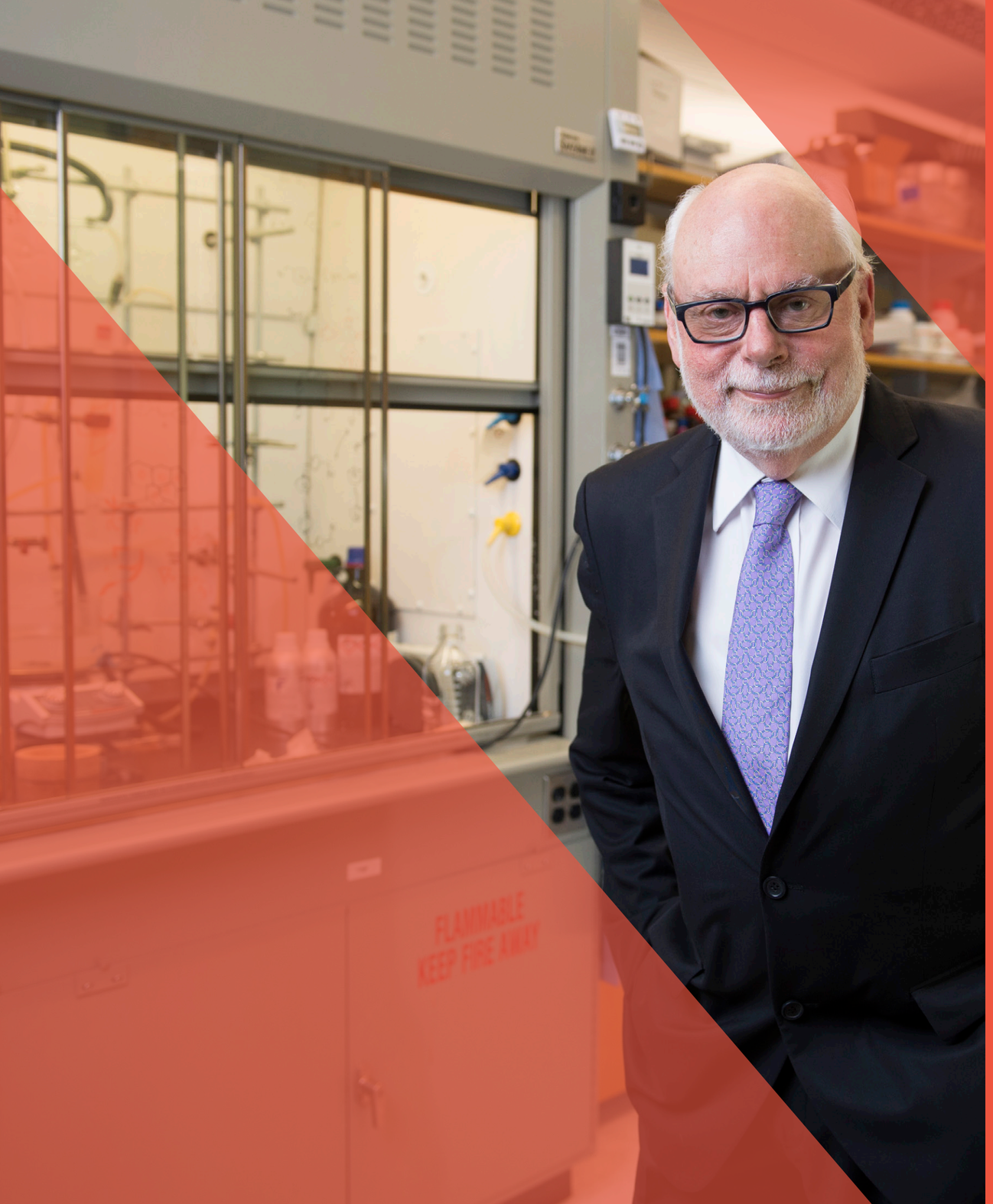
And that is precisely why Northwestern promotes and supports student entrepreneurship: to expand the academic experience beyond the classroom and provide practical life skills such as empathy, resiliency, persistence, and resourcefulness that will enrich and power students' lives.

Whether pursuing their own entrepreneurial efforts at places like The Garage, which serves approximately 60 Resident teams each quarter, or working alongside faculty to commercialize ambitious research, Northwestern encourages students to be innovators, to take risks, to rebound from struggles, and to shape an adventure uniquely their own with the critical lessons of their entrepreneurial journey serving as motivation and guidance.

"We aim to instill confidence in students to become self-starters, giving them a safe space to take risks and innovate, and provide a valuable entrepreneurial experience they can call upon as they forge their own paths to success," says Melissa Kaufman, Executive Director of The Garage.

"I have learned that the vision of where or who we want to be is the greatest asset we have and that entrepreneurs are people who transform industries by pursuing ideas that were once unthinkable. That is the kind of person I want to become in the future!"—Eduardo Uriarte Ruiz (Kellogg '17), who worked on his startup, Kairos Air, as a Resident at The Garage before joining transportation startup Via in 2017

Melissa Kaufman, Executive Director of The Garage, and The Garage team (left), meeting with Resident students gathered for weekly Family Dinner, when The Garage community comes together to hear from a visiting entrepreneur.



AN UNDENIABLE SYNERGY BETWEEN SCIENTIFIC EXCELLENCE AND ENTREPRENEURSHIP

JOHN ROGERS' (MCCORMICK, FEINBERG) entrepreneurial prowess is evident in his possession of more than 80 patents, over 50 of which are licensed or in active use, while his prolific research has earned him spots in the National Academy of Engineering, the National Academy of Sciences, and the American Academy of Arts and Sciences as well as a MacArthur "genius grant."

For Rogers, the two—research and entrepreneurship—are not exclusive entities, but rather synergistic partners that inform and fuel the creation of game-changing technologies.

Consider Wearifi, Rogers' upstart venture offering millimeter-scaled devices that monitor an individual's health status or their exposure to environmental hazards such as ultraviolet light from the sun. Rogers and his team developed the core technology inside Northwestern's labs, consistently driven to establish a foundational understanding of the underlying science while also possessing an appreciation for its commercialization prospects. Today, the work has transitioned out of his academic group and into a separate, commercially oriented team at Wearifi to productize the technology through a joint development agreement with global cosmetic powerhouse L'Oréal.

Rogers' two other current startup ventures—Epicore, which produces microfluidic devices for performing chemical analyses of sweat, and Neurolux, which sells implantable wireless devices that allow neuroscientists to study the function of the brain—are similarly rooted in foundational research with the potential of broader societal impact.

Rogers is among a number of Northwestern faculty members pairing the highest levels of scholarship with ambitious entrepreneurial vision. Among many others:

- Chad Mirkin (Weinberg) and his heralded startups Exicure, TERA-Print, CDJ, Nanosphere, and NanoInk
- Dimitri Krainc's (Feinberg) Lysosomal Therapeutics Inc., a startup he founded while at Harvard, and Ulara, a Northwestern startup, cultivate new therapies for patients with severe neurological diseases
- Sam Stupp (McCormick, Weinberg, Feinberg), whose NanoSlurry AEB medical device is on the brink of FDA approval
- Sir Fraser Stoddart (Weinberg), the recent Nobel Prize honoree driving a pair of compelling startups in Cycladex and PanaceaNano
- Sossina Haile (McCormick), who continues to develop commercially promising solar fuel machines while actively engaged in numerous entrepreneurial ventures
- Vadim Backman (McCormick) and his early cancer detection instrumentation startups, American BioOptics, NanoCytomics, Preora Diagnostics, and Unicorn Therapeutics

"For me, research and entrepreneurship are intimately linked and can greatly impact the world when they are configured together in a proper way. That's something I aspire to as a scientist. When my career is over, I want be able to point to more than a stack of published papers. I hope to leave a legacy of advanced technologies of value to society."—John Rogers, Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering, and Neurological Surgery

Sir J. Fraser Stoddart (left), Board of Trustees Professor of Chemistry. Professor Stoddart was awarded the 2016 Nobel Prize in Chemistry for his development of a "rotaxane" a tiny molecular machine that can perform a task when energy is added.

STRIVING TO IMPROVE THE DIVERSITY OF INVENTORSHIP AND ENTREPRENEURSHIP

Figures 8, 9 and 10 represent the gender distribution of tenured and tenure-eligible faculty and the percentage of whom have disclosed inventions during FY 2017.

Weinberg College of Arts and Sciences percentages represent faculty from the departments of Chemistry, Molecular Biosciences, Neurobiology and Psychology.

Figure 8. McCormick School of Engineering inventors among tenured and tenure-eligible faculty

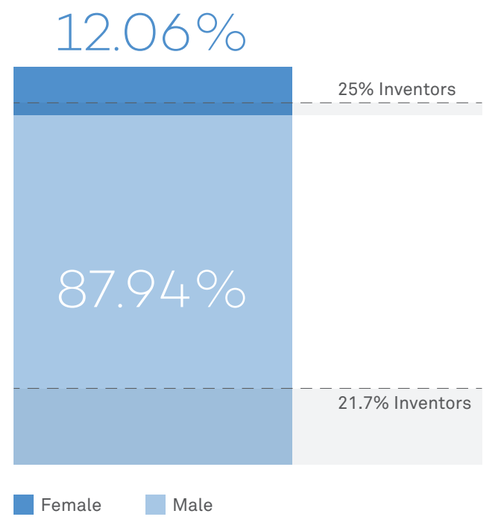


Figure 9. Feinberg School of Medicine inventors among tenured and tenure-eligible faculty

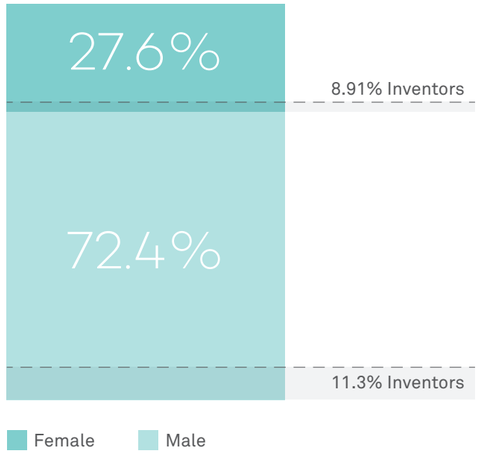
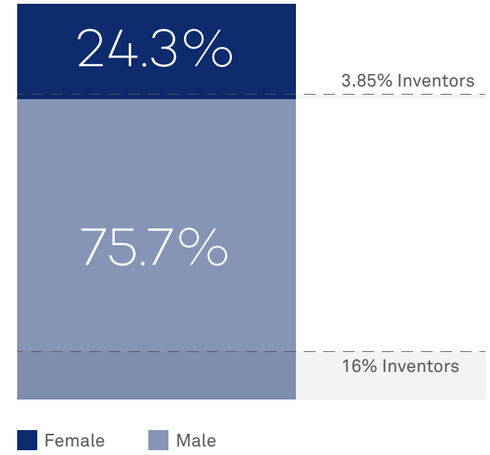


Figure 10. Weinberg College of Arts and Sciences inventors among tenured and tenure-eligible faculty



IN THE ENTREPRENEURIAL ARENA, Northwestern University is not interested in maintaining the status quo.

Through a range of partnerships, Northwestern plays a burgeoning role in the region's entrepreneurial ecosystem and it is one that delivers rich value to the University: magnifying its voice and influence in the area's ever-growing startup scene; bolstering research at campus laboratories; affording Northwestern an early foothold in emerging research areas; and providing faculty and students access to impactful resources. Most importantly, this entrepreneurial ecosysytem acts as a powerful magnet for talent and opportunities.

Ever-evolving relationships with Northwestern Memorial Hospital, the Shirley Ryan AbilityLab, and the Ann & Robert H. Lurie Children's Hospital of Chicago, among other institutions, are helping to build one of the strongest and most innovative medical districts in the country, a bet that shrewd, inter-institutional alliances can drive life-changing technologies.

As a member of the Chicago Biomedical Consortium, a Searle Funds-supported collaboration among the Chicago area's preeminent medical institutions, Northwestern continues pursuing innovative discoveries aimed at transforming biomedical research and improving human health.

Meanwhile, a recent partnership with the Cleveland Clinic includes Northwestern's presence on a National Institutes of Health translational grant for medical devices, therapeutics, and health IT technologies. This partnership, together with INVO's NewCures accelerator reinstates Northwestern's leadership in biomedical innovation.

Through Northwestern's membership at three prominent Chicago area accelerators—1871, MATTER, and mHub—University-affiliated startups receive space alongside direct access to each environment's energized atmosphere of inspiration, information, and innovation.

And finally, partnerships with Horizon Pharma, Takeda, and MATTER have helped Northwestern champion increased diversity in innovation with efforts such as INVOReach, which promotes female participation on the boards of local startups.

Taken collectively, these partnerships ensure Northwestern maintains robust connection points to Chicago's vibrant entrepreneurial ecosystem and its daring, industry-driving innovations that stimulate a better Northwestern, a better Chicago, and a better world.

"Through our partnerships, we want to translate technologies from the bench to the real world, that have impact on human lives, and we also want to create startups, jobs, and contribute to the economic development that adds value to our region and the world..."—Dimitra Georganopulou, INVO Innovation and Commercialization Officer

Epicore Biosystems (left). Creating soft microfluidics devices in the form of flexible, stick-on patches that measure biomarkers present in sweat for health status determination (Prof. John Rogers).

PATENT FILING INCREASED 8.4% FROM FY16. Figure 11 shows patents filed in FY17 per school. Patent filing is consistent with the invention disclosure activity reported in Figure 2. Figure 12 illustrates the breakout of patents filed in FY17.

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; and
- Delays the formal filing date, which results in a later patent expiration date.

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 phases to proceed towards grant of one or more patents. Foreign prosecutions are very expensive. INVO files in specific countries (National Phase) only when there is a licensee for the patent.

Continuing patent applications (CIP): These are patent applications that follow and claim priority to an earlier filed patent application.

EPO Validation: Granted European patents that are in the process of validation in individual states.

Divisional patent applications: Patent applications with claims that were divided out of the original filed application and which have to be re-submitted as a separate application.

Figure 13 illustrates that patent filings span many disciplines and markets.

Figure 11. Filed patent applications by school

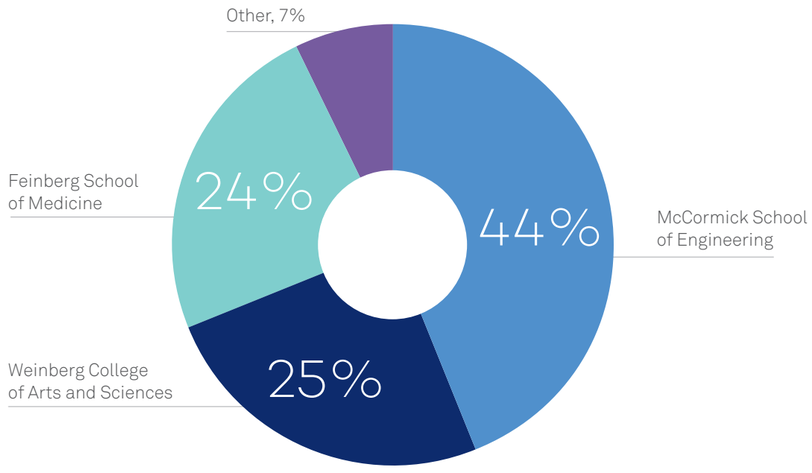


Figure 12. Filed patent applications by type

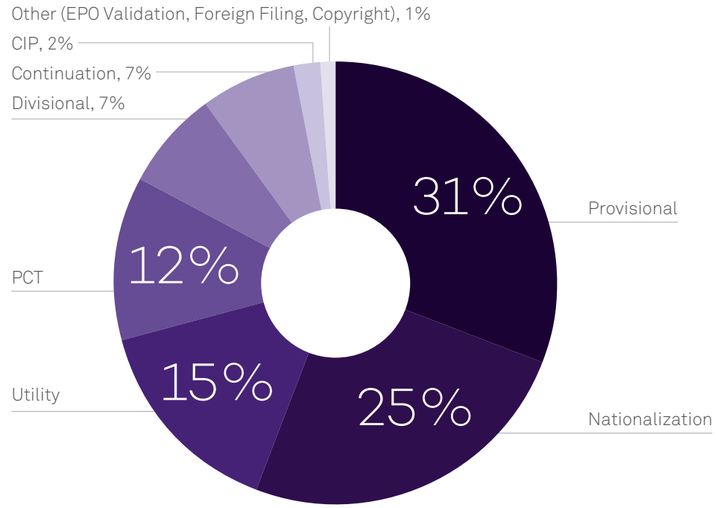
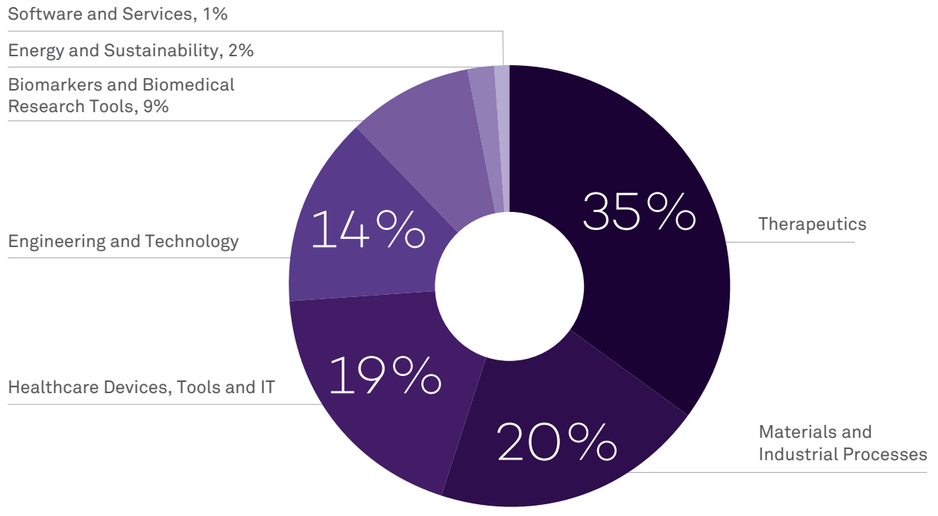
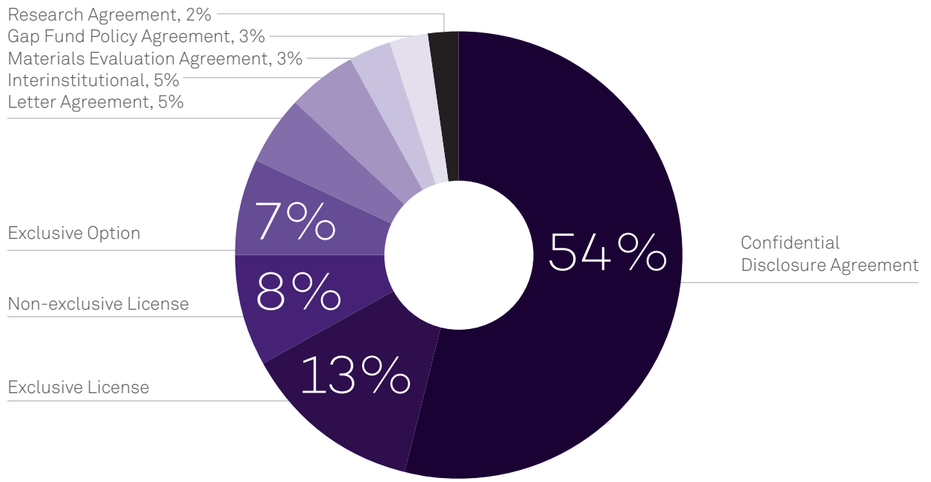


Figure 13. Issued patent applications by category



THERE ARE THREE MAIN PATHS TO COMMERCIALIZE ACADEMIC INVENTIONS: LICENSE TO DEVELOPERS, LICENSE TO SPINOUTS, OR PARTNERING.

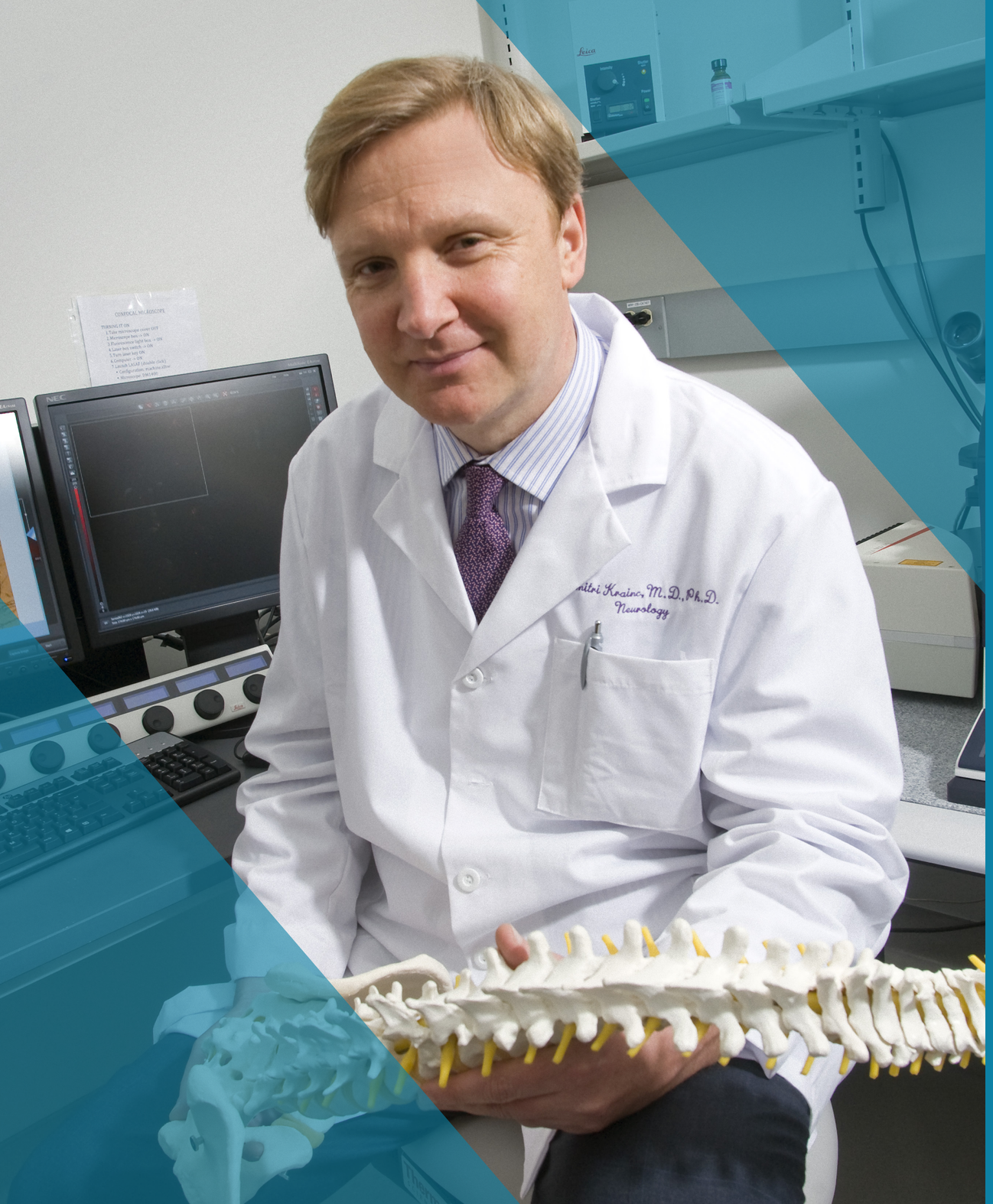
Figure 14. Agreements by type



INVO executed 210 agreements during FY17, representing a 24% growth compared to FY16 and more than two and a half times the agreements in FY15. Agreements ranged from interinstitutional agreements to material evaluation agreements and licenses.

The volume of agreements signals a continuing growing external interest in Northwestern's inventions. There are three main paths to commercialize academic invention: license to developers, license to spinouts, or partner with commercial entities. Most co-development partnerships will include some type of licensing agreement as well.

Exclusive licenses or options are generally executed for technologies that require significant private investment to reach the marketplace or are so early stage that exclusivity is necessary to induce investment needed to determine utility.



FROM GENOMICS TO PHOTONICS: NORTHWESTERN RESEARCHERS TAKE AIM AT NEURODEGENERATIVE DISEASES

UPWARDS OF FIVE MILLION INDIVIDUALS across the U.S.—and millions more around the globe—suffer from neurodegenerative diseases such as Alzheimer's, Parkinson's, amyotrophic lateral sclerosis (ALS), and Huntington's disease. These conditions, which cannot be prevented, cured, or even slowed, impact essential activities from balance and breathing to speech and heart function, weakening the quality of life for those battling the disease and taxing caregivers as well as the healthcare system.

With neurodegenerative diseases prone to strike later in life, experts forecast increased incidence rates as life expectancies climb, a reality that only heightens the urgency to find suitable treatments, if not full-blown cures.

That pressing human and global challenge continues fueling the creativity of Northwestern researchers.

Over the last three years, Hooman Mohseni (McCormick) has been leading a team of scientists using light to enable simultaneous communication between thousands of neurons, something only done today on small scale. Mohseni's promising work has the potential to study neurodegenerative diseases at the single-neuron level and to impede the impact of these crippling diseases by reconnecting neurons.

Clinical neurologist and physician scientist Dimitri Krainc (Feinberg), meanwhile, is researching neurodegenerative diseases at the molecular level. Insights from this research, he says, will help pinpoint targets and pathways amenable to intervention. As one example, Krainc and his team studied an enzyme linked to Parkinson's called GBA, specifically investigating how loss of this enzyme contributes to Parkinson's and potential ways to make it active.

It's complex, challenging, and consuming work, Krainc acknowledges, but absolutely necessary to combat these debilitating diseases.

"Our patients and their families provide constant inspiration. Today, we can help those facing these devastating diseases through clinical exams and certain interventions, but the most significant help will come through research and efforts to discover cures. That's our driving focus because that's what our patients and their families expect and deserve."—Dimitri Krainc, Aaron Montgomery Ward Professor and Chair of the Ken & Ruth Davee Department of Neurology at Northwestern University

Dimitri Krainc (left), Aaron Montgomery Ward Professor and chair of Neurology.

NORTHWESTERN STARTUPS RAISED MORE THAN $85 MILLION IN FY17

FY2017 was a banner year for NU startups and SBIR/STTR awards—$11.7M in awards. (The average over the last decade for NU startups was $6.2M/year.)

An important metric for startup success is the ability to fundraise from the private sector In FY17, Northwestern startups raised more than $90M and signed more than $1B in co-development agreements.

The outstanding success of these startups is proven validation of the quality of Northwestern's inventions.

These companies included: 4C Insights, Narrative Science, Exicure, and Flextera.

Figure 17. Startups by school

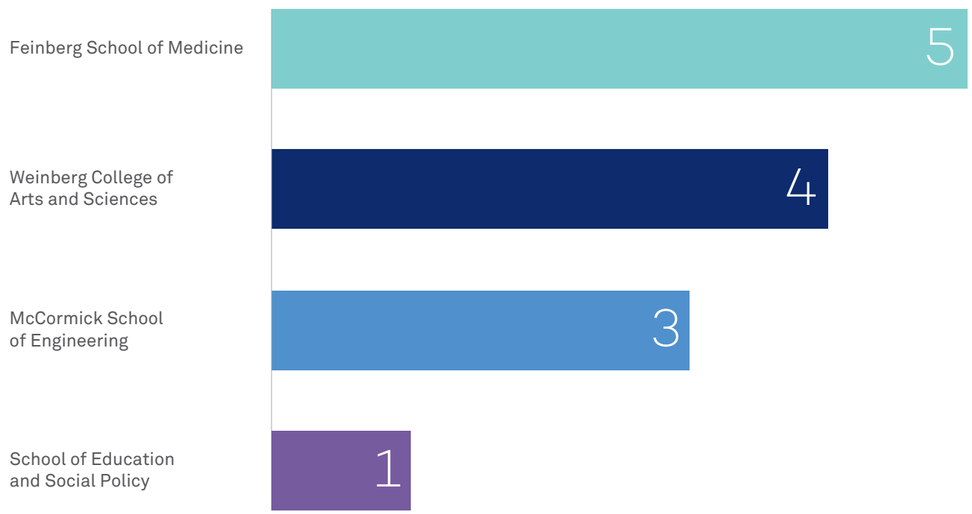
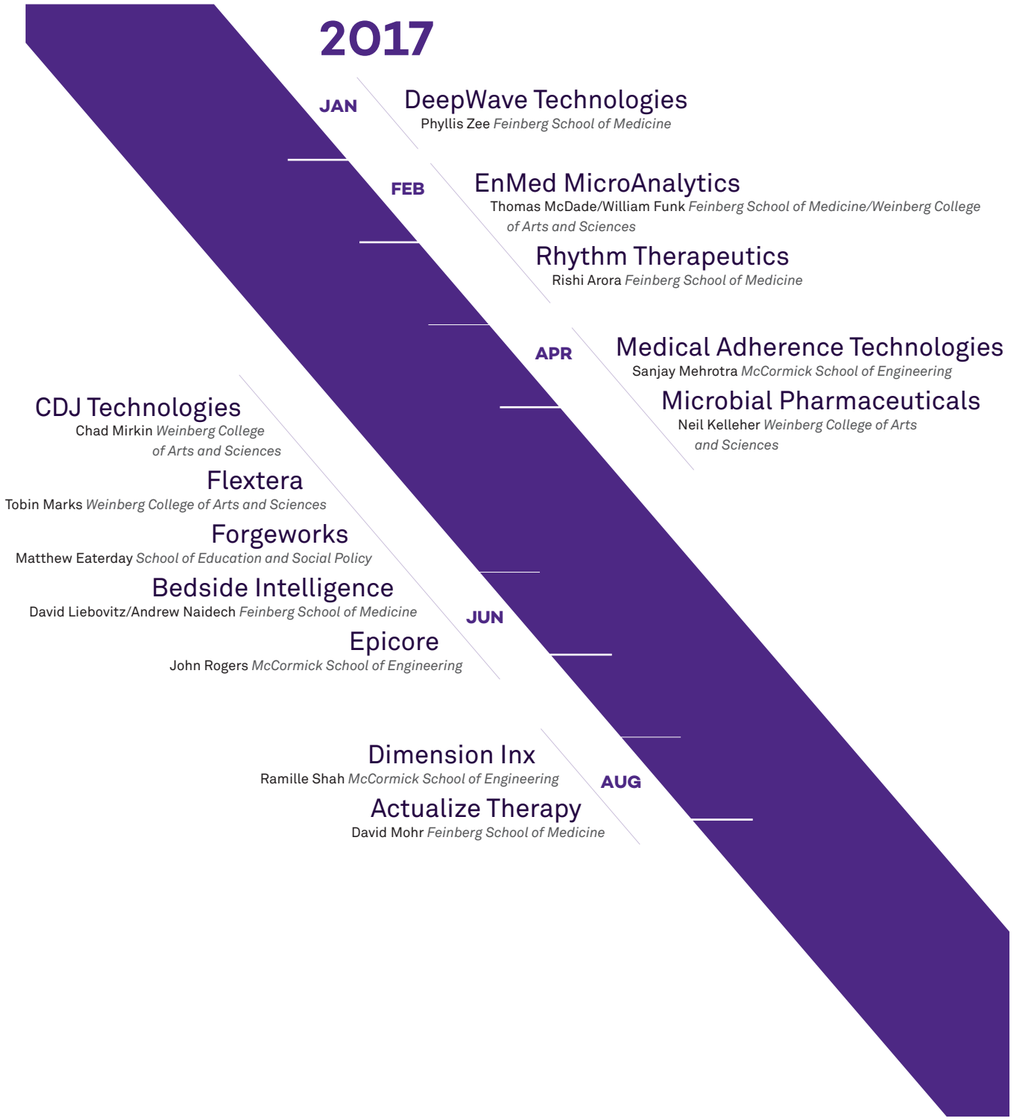


Figure 18. FY17 Startups



APPENDIX

BIOMARKERS

- Biomarker for Colitis
- Biomarker for Early Stage Cancers
- Biomarker for Female Egg Quality
- Biomarkers for Glioma Treatment Response
- Biomarkers for Prostate Disease
- Biomarkers for PTSD and Depression
- Cardiac Stress Test with MRI
- Genetic Marker for ALS
- Imaging for Steroid
- Marker for Chronic Pelvic Pain
- Method for Screening *P. Aeruginosa* Strains
- UTI Management

NUCLEIC ACIDS

- RNA-Directed Gene Editing
- Lung Gene Transfer
- Nuclear Lamins Expression Vector
- Clock Gene cDNA
- Timeless gene cDNA
- pAN1: ElectroTfm of Clostridium
- Luciferase Reporter with hsp70.1
- *C. acetobutylicum* Gene Expression Plasmids
- Hollow Nanoflares

ANTIBODIES

- CD31, CD87 and CD15 mAbs
- Tubulointerstitial Nephritis Antibody
- Myeloid Restricted CD13 mAb
- HSP70, HSC70 and HSP72 mAbs
- mAb Murine Hybridoma: Vascular Endothelial Ag
- Influenza Virus M2 mAb
- Mutant HSP70/BiP/grp78 mAbs
- Importin β1 mAb
- PGSL-1 mAb
- mAb for Tau Truncated at Residue 412
- Human γ2 Laminin C-Terminal mAb
- Human and Rat α3 Laminin mAbs
- Hemidesmosome BP230 mAb
- Hemidesmosome BP180 mAb
- Rat Laminin-332 α3 subunit mAb
- α4 Laminin mAb
- Tau Nitrosylated Tyr18 mAb
- Tau Nitrosylated Tyr29 mAb
- Tau PAD Region mAb (TNT-1)
- HSF1 and HSF2 mAbs
- Lamin A and C mAbs

Mouse
Rat
Rabbit

CELL LINES

- Cholinergic Neurons from Stem Cells
- Retinal Muller Cell Line
- MM.1 Myeloma Cell Lines
- *E. coli* Isolated from Human Prostate
- *S. cerevisiae* H4S47C

Mammalian
Bacterial
Yeast

MOUSE MODELS

- Tg Mouse for Amyloid Pathogenesis
- Superoxide Dismutase Tg Mice
- Mt Clock Gene Tg Mice: Circadian Rhythm
- Per2-Luciferase Tg Mice: Circadian Rhythm
- BMP4 Tg Mice: FOP Clock Tg Mice: Diabetes
- Uchl1-eGFP Tg Mice: Motor Neurons in ALS
- Spinal Motor Neutron Degeneration Tg Mice
- Human Trace Amine Associated Receptor
- Dyrk-1 Conditional KO
- MLCK210 KO Mice: Acute Lung Injury
- Synapse Dysgenesis
- KO Mice

Transgenic
Knock-out

MISCELLANEOUS

- Reverse Transfection Technique
- *Ex Vivo* Female Reproductive System
- Non-Toxic Probe for Cell Staining
- Cell Sorting Method Based on Motility
- High Throughput 3D Transfected Cell Arrays
- Biomarker for Replicative Senescence
- Fluorescent Sensors for Zinc
- Cell-Free Yeast Protein Synthesis
- Methods for Ribosome Production
- Exosome Targeting
- Tethered Ribosome Production
- Enhanced Gene Silencing by RNAi
- Scaffolds for Artificial Ovary
- Detergent-Free Membrane Solubilization
- Raman Spectroscopy for Anthrax Detection
- Raman Biosensor for Multianalyte Detection
- Partition Layer for Raman Nanobiosensor

HEALTHCARE DEVICES, TOOLS AND IT PIPELINE

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CONCEPT

- 3D Printed Intraocular Lens
- 3D Printing of Endovascular Stents
- **A Novel Hydroxyapatite Composite**
- Analysis of Multiplexed Bead-Based Assays
- Cartilage Coupled Peptide Polymers
- Catheter for Gene Therapy
- Extracellular Matrix with Anticoagulant Properties
- Imaging & Therapeutic Nanoconjugates
- Left Atrial Appendage Occluder Device
- Microfluidic Device for Detection of Circulating Tumor Cells
- Nanostructures for Alzheimer's Diagnosis
- Scar-Free Tissue Regeneration
- Sealants for Fetal Membrane Repair
- Self Assembled Bioadhesives

LABORATORY PROTOTYPE

- 3D Printed Soy Scaffolds
- Adaptable Ankle Foot Prosthesis
- Adhesive Hydrogels for Surgery
- Anthrax Detection
- Anti-Microbial Hydrogel Coatings
- App for Movement Disorders
- Arsenoplatins for Cancer Treatment
- Artificial Blood Capilary Beds
- **Atrial Fibrillation Electrograms**
- Biocompatible Hydrogels
- Biodegradable Drug Delivery
- Cardiac Tissue Ablation
- Chalco-Halides for Medical Imaging
- Chamber for *in situ* Wound Healing
- Coupling Therapeutic Agents to Tissues
- Diabetes Matrices
- DOPA Nanoparticles
- Electronic Biochip System
- Electronic Biochip System with Feedback
- *Ex Vivo* Female Reproductive System
- Extra-Strength Hydrogel Adhesives
- ECM with Anticoagulant Properties for Tissue Engineering
- Female Fertility Test
- Heavy Metals in Dried Blood Spots
- Hydrogels for Improved Tissue Graft Survival
- *In Vivo* Raman Glucose Sensor
- iSOCT
- IVC Filter Removal
- Left Ventricular Apex Surgical Technology
- Low Power Cochlear Implant
- Macromolecular MRI Contrast Agents
- Materials that Promote Bone Regeneration
- Membrane Coatings pH Sensitive Anticancer Drug Delivery
- **Intrinsic-Contrast Super-Resolution Optical Microscope**
- **Metabolic Optical Coherence Tomography**
- Micro Drug Delivery Device
- MRE Passive Driver
- Multi-Input Cantilever
- Multimodal T1-T2 MRI Contrast Agents
- Nanofabricated Glucose Sensor
- Nanoparticles for Diagnosis and Therapy
- Nanostructures for CNS Cancers
- Novel Chalco-Halides for Imaging
- Parylene Membranes for Drug Delivery
- Peptide Conjugated MRI Contrast Agent
- Perovskites for Gamma-Ray Detection
- pH Responsive Polymer Caged Liposomes
- pH Responsive Self-Healing Hydrogels
- pH-Sensitive Drug Delivery Polymers
- Prosthetic Leg
- Protein-Based Contrast Agents for MRI
- Real-Time Patient Volume Predictor Instrument
- Self-Healing Hydrogels
- Shock Absorber for Prosthetic Leg
- **Soft Materials for Bioprinting**
- Stroke Rehabilitation System
- Structured Illumination Microscopy
- Substrate-Independent Anticoagulant and Antibacterial Coatings
- Thermoresponsive Cell Adhesive Bioresorbable Dressing
- Triple Balloon Catheter
- **Wearable for Ambulatory Blood Pressure Monitoring**
- Whisker Sensor
- Zinc Sensor for MRI

COMMERCIAL PROTOTYPE

- **3D Suture**
- **Poly (Diol-Co-Citrate) Hydroxyapatite Composite**
- Ankle Prosthesis
- Automated fMRI for Clinic
- Bioscaffolds for Replacement Ovaries
- Brain Wave Processing to Enhance Sleep
- Cell Therapy for Diabetes
- Central Line Insertion Training Curriculum
- Diaphragm-Based Hybrid Prosthetic Vacuum Pump
- Evaluating Impact of Oxidative Stress on AF Electrograms
- Flexible Electronic Medical Device
- Gas Sensor for Smart Chest Tube Drainage
- Hearing Test
- Implantable Biomedical Sensors
- Liquid Cast Biodegradable Drug Delivering Arterial Stent
- Mammary Prosthesis
- Motorized Software: Controlled Calibrator
- MRI-Perfusion and Diffusion Mismatch
- Nanodiamond Conjugates
- Neonatal Abdominal Surgery Trainer
- **Optical and Acoustic Imaging**
- **Partition Layer for Raman Nanobiosensor**
- Photodetector for Infrared Imaging
- Point of Care Diagnostics
- Quantification of Cerebral Perfusion
- Raman Biosensor for Multianalyte Detection
- Raman Spectroscopy for Anthrax Detection
- RF Ablation Probe
- **SERS Sensor for Lactate**
- Silica Polymer Pen Lithography
- SNR Improvements for Multi-Slice MRI
- Substrate-Independent Adhesive Coating
- Virtual Electrophysiologic Test
- Vocal Cord Medialization

HUMAN TESTING

- **AF Electrogram Analytics Software**
- **AF Peak Detection**
- **Atrial Fibrillation Diagnostic**
- **Bedside Wound Pulse Lavage**
- **CA Diagnostic with Microscopy**
- **Endoscopic CA Diagnostic**
- **Hearing Aid Interface**
- **HIV Diagnostics**
- **Medical Adhesives**
- **Polymers for Vascular Disease**
- **Pre-Free Colon CA Screening**
- **Rehabilitation Robotics**

APPROVAL AND MARKETING

- **Mobile Apps for Depression and Anxiety**
- **Cement Mixer**
- **Northwestern Anagram Test (NAT)**
- **Northwestern Assessment of Verbs & Sentences (NAVS)**
- **Northwestern Naming Battery (NNB)**
- Rehabilitation Devices
- **Treatment of Underlying Forms (TUF)**

THERAPEUTICS PIPELINE

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NEW TARGETS

- Anti Inflammatory Antibodies
- Antibiotic-Coated Nanoparticles
- Bacterial NOS Inhibitors as Antibiotics
- Chromatin Therapy to Sensitize CA Cells
- CXCR4 Modulators
- Exosomes: Cholesterol Modulation
- Female Fertility Treatment
- FGF23 Normalizing Methods
- Gene Therapy: Anti-Depression
- HDL-Like Nanoparticles: Inflammation
- Hydrogel Wound Dressing with Cu Ions
- Immunotherapy: Macular Degeneration
- Kinase Inhibitors: Cancer
- MAPK Compounds: CNS Disorders
- MLCK Inhibitors
- Pro-Drugs: *Streptococcus*
- Scar-Free Tissue Regeneration
- Screen for Covalent Drugs
- Sirtuin Inhibitors
- Thermoresponsive Adhesive Dressing

HIT TO LEAD

- AMPA Receptor Antagonists: Neurologic Diseases
- CD154 Trimer Stabilization: Immunity
- Compounds against Nodal Pathway (CA)
- Compounds for CNS Diseases
- Compounds: Neurologic Disorders
- Epstein-Barr Virus Inhibitors
- FFAR2 Agonists: Type 2 Diabetes
- Flufenamic Acid for Chronic Pain
- G Protein Inhibitors: Cardiovascular
- HIV Therapeutics
- Ion Channel Manipulation: Parkinson's
- Maspin: Bone Disorders
- Megakaryocytic Leukemia Treatment
- Megamolecule Synthetic Antibodies
- p53 Reactivators: Cancer
- Peptides for PEDF
- Peptides: Cancer
- Plaque Digestion: Cardiovascular
- **Potential New Modulator of Angiogenesis**
- **Small Molecule Antiviral Therapy**
- Small Molecules against ALS
- Soft Materials for Bioprinting
- Stem Cell Signaling Molecules for Cancer Therapies
- TGFb Inhibitor Transgene
- Therapeutic Exosomes
- Urinary Tract Infection Vaccine

LEAD OPTIMIZATION

- β lactamase Inhibitors: Antibiotics
- Bladder Regeneration
- Gene Silencing Enhancers
- Gene Therapy: Atrial Fibrillation
- Glucocerebrosidase Modulators
- GLUT Antagonists Cancer 2
- GLUT Antagonists: Cancer 1
- Herpes Virus Vaccine and Oncolytic Vectors
- Inflammation Modulator
- Inhibitors for Triple Negative Breast Cancer
- Inhibitors: Leukemia
- Kinase Inhibitors
- Malaria Prophylaxis
- Maspin Protein Mimics for Cancer Treatment
- Nanoparticulate Arsenic Platinum Drugs
- **Neurodegenerative Disease Therapy**
- **Neuroprotective Therapeutics**
- Peptides: Neurodegeneration
- Small Molecules: Parkinson's Disease
- Triggered Release Arsenic: Cancer

PRE-CLINICAL DEVELOPMENT

- **Alzheimer Immunotherapy**
- Bladder Regeneration
- Chronic Pelvic Pain Vaccine
- *E. Coli* Isolated from Human Prostate
- Flavanones & Chromanones: Cancer
- GABA Aminotransferase Inhibitors
- GABA Analogues: Hepatocellular Cancer
- Glycosides for Cancer
- Human Melanoma
- Isradipine: Parkinson's
- Liposome Coated Nanostructures
- Medical Food
- Method to Control Dopaminergic Neuron Pacemaking
- Nanodiamonds for Imaging and Drug Delivery
- **Neurodegenerative Compounds**
- Nitric Oxide Synthase Inhibitors
- NOS Targeting: Neurodegeneration
- **Numonafide: Cancer Therapy**
- Peptide Vaccine for Lupus
- **Peptide-Coupled Nanoparticles**
- **Peptides: Immune Tolerance**
- **Preventing Allograft Rejection**
- Preventing Scar Formation
- Preventing UTI Symptoms
- Scaffolds for nNOS Inhibition
- Self-Assembling Nanovirus
- Sensitization to Steroids
- Small Molecule: Liver Cancer
- Small Molecule: Cancer Therapy
- Small Molecules against Hepatocellular Carcinoma
- **Small Molecules: CNS**
- **Spherical Nucleic Acids: Gene Regulation**
- Statin for Hearing Loss Prevention & Therapy
- **Tau Monoclonal Antibodies**
- Topical Wound Treatment
- VEGF Mimic to Treat Ischemia
- **Wound Healing with Antisense Molecules**

CLINICAL TRIALS

- **Antisense Molecules**
- **Gene Regulation with NP-Nucleic Acid**
- **GLYX-13: Depression and Pain**
- **Lead Compounds for Neurodegeneration and Neuroinflammation**
- **Metallophile Technology: Cancer**
- **Metallophile Technology: ID**
- **NMDAR Modulators**
- **Organ Transplantation**
- **Small Molecules for Tourettes Syndrome**
- **Treatments for Traumatic Brain Injury**
- **TIMP–Celiac Disease**

APPROVAL

- **Lyrica: Fibromyalgia**

ENGINEERING AND TECHNOLOGY PIPELINE

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RESEARCH

- A Spin-Diode Logic Family
- All-Carbon Spin Logic
- Bipolar Magnetic Junction Transistor
- Complementary Magnetic Tunnel Junction Logic
- **Doped Tin Selenium Single Crystals**
- Emitter-Coupled Spin-Transistor Logic
- Gate-Tunable Nanoscale Memristors
- Integrated On-Chip Thermocouple Array
- Lock-Arm Supramolecular Ordering
- Magnetic Diode Based Programmable Logic
- Molecular Electronic Devices
- New Class of Molecular Iodosalts for Use in Next Generation Solar Cells
- Novel Protective Polymers for Circuitry
- Threshold Logic with Electrostatically Formed Nanowire Transistors
- Tin Based 'Perovskites' for Solar Cell Production
- Transverse Thermoelectrics
- Two Qubit Gate
- Ultralow Power Carbon Nanotube Logic Circuits

RESEARCH VALIDATION

- Microelectromechanical Device for *in-situ* TEM
- Antiambipolar Heterjunctions from Solution-Processed Semiconductors
- Atomic Force Electroluminescence Microscopy
- Bridge Enhanced Nanoscale Impedance Microscopy
- Commercial-Scale Synthesis of p-Type Transparent Conductors
- Contactless Electrical Characterization of Buried Conducting Layers
- Deducing Charge Density Gradients in Doped Semiconductors
- Efficient, Low-Cost Method for Isolation of Semiconducting SW CNTs
- Electric Field Sensor with Ultra-Sensitivity over Broad Frequency
- Gate Tunable p-n Heterojunction Diode
- Highly Homogeneous ZrOx Tunnel Barriers via Multi-step Deposition and Oxidation
- Layer-by-Layer Self-Assembly of Large Response Molecular Electro-Optic Materials
- **Lead-free Solar Cells**
- Magnetic Field Sensors
- Magnetic Shape-Memory Foams for Actuators and Other Industrial Purposes
- Method for Generation of Multifunctional Nanocomposites
- Microscopy for Current Flow
- Nanoscale Subsurface Imaging Method via SNFUH
- New Silver Containing Cathode for Primary Lithium Batteries for Medical Devices
- Nonlinear Optic Glassy Fiber with Strong Intrinsic Second Harmonic Generation
- Sorting Two-Dimensional Nanomaterials Using Density Differentiation
- Supported Catalysis for *in situ* Synthesis of High Energy Density Nanocomposites
- Thallium and Bismuth Chalco-Halides for X-Ray and Gamma-Ray Semiconductor Detectors
- Tracking Circuit for Hardware Security and Reconfiguration
- Waveguide Modulators in Ferroelectric Thin Films

COMMERCIAL VALIDATION

- Acene-Based Organic Semiconductor Materials
- Combustion Processing for Metal Oxide Thin-Film Electronics
- Conducting and Transparent Graphene-Containing Thin Silica Films
- Conductive and Transparent Thin Films
- Controlled Nanoscale Doping of Transparent Conducting Oxides
- **Flexible Electronic Displays**
- **Highly Efficient Broadband Second Harmonic Generation Using BaTiO3 Thin Film Waveguides**
- Hot Pressing Method for Transistors
- Low-Voltage Organic Electro-Optic Modulators
- Nanoscale Self-Assembled Organic Dielectrics
- Novel Intercalated Superlattices with Modulating Dielectric Properties
- Organic Electro-Optic Chromophores with Superior Hyperpolarizability
- Organic Electro-Optic Modulators with Transparent Electrodes and Device Structures
- Organic Semiconductor Formulations for Improved Manufacturing Capabilities
- **p-Type Semiconductor Nickel Oxide In Organic Photovoltaics**
- Printable Dielectrics for Electronic Devices
- SAND Organic Dielectrics
- Silole-Containing n-Conjugated Polymers
- **3D Vision System**
- **Thiophene-based materials for optoelectronics**
- Transparent Nanowire Transistors

MARKET

- Graphene Ink for Gravure Printing
- High Conductivity Graphene Inks

ENERGY AND SUSTAINABILITY PIPELINE

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RESEARCH

- **Doped Tin Selenium Single Crystals**
- Mixed-Phase Titanium Dioxide Photocatalyst
- New Class of Molecular Iodosalts for Use in Next Generation Solar Cells
- **PAH Scavenger System (ExBox)**
- Photocatalytic Composite for Organic Chemical Oxidation
- Polysulfide Compounds for Environmental Remediation of Fossil Fuel and Nuclear Waste
- Single Platform Offers Dual *in situ* Photocatalytic and Thermocatalytic Activities
- Tin Based 'Perovskites' as Lead-Free Alternative Photovoltaic Materials for Solar Cell Production

RESEARCH VALIDATION

- A Novel Process for Epoxidation of Unsaturated Hydrocarbons
- A Novel Solid Oxide Electrolysis Cell with Improved Efficiency and Durability
- Aluminum Metallic Nanoparticle-Polymer Nanocomposites for Energy Storage
- An All-Carbon Counter Electrode for Dye Sensitized Solar Cell
- Bithiophene-Based Interfacial Layer for High-Efficiency Bulk-Heterojunction Organic Photovoltaic Cells
- Carbon Nanoparticle for Energy Storage
- Commercial-Scale Synthesis of p-Type Transparent Conductors
- Controlling Charge Injection in OLEDs by Tuning Interfacial Properties of the Anode Hole Transport Layer
- Crosslinkable Polymer Dielectrics
- **Crumpled Graphene-Encapsulated Si Nanoparticles for Lithium Ion Battery Anodes**
- DOPA-Melanin Films and Particles as Antimicrobial Compound Carriers and Heavy Metal Scavengers
- **Electron-Blocking Layer for Improved Organic Photovoltaics**
- **Improved Lead-Based Eutectic Composite**
- Improved Monodispersity of Core/Shell Nanoparticles via Centrifugal Processing
- Improving Efficiency and Productivity of Titania Catalysts with Graphene
- Integrated Solid Oxide Fuel Cells
- Large-Area Subwavelength Hole Arrays
- **Lead-free Solar Cells**
- Lithium Ion Battery Anodes Based on Graphitized Silicon Carbide
- Magnetic Shape-Memory Foams for Actuators and Other Industrial Purposes
- Mesoscale Metallic Pyramids with Nanoscale Tips
- Metal-Oxide Coating Method for Safer, More Efficient Dye-Sensitized Solar Cells
- **Nanoporous Materials**
- New Silver Containing Cathode for Primary Lithium Batteries for Medical Devices
- Nitrogen-Free Plant Polyphenol Derived Coatings
- Novel Battery Cathode with High Rate Discharge Capability for Lithium Batteries
- Novel Intercalated Superlattices with Modulating Dielectric Properties
- Novel Separator for Electricity Storage Devices
- Operation of Anode Supported Solid Oxide Fuel Cells on Methane and Natural Gas
- Optimizing Location for Placing Electric Vehicle Charging Stations
- Organic Hosts Covalently Bonded to Silicate Matrices for Separations, Catalysis and Remediation
- **p-Type Semiconductor Nickel Oxide as an Anodal Interfacial Layer in Organic Photovoltaics**
- **Porous Nanocrystalline Materials for Improved Compound Storage**
- Self-Assembled Nanodielectrics (SANDs) with Improved Leakage Protection
- SMOFC Battery Cathode
- Solid State Solar Cell that Overcomes Limitations of Grätzel Cell
- Supported Catalysis For *in situ* Synthesis Of High Energy Density Nanocomposites
- TFB:TPDSi2 Interfacial Layer as a PEDOT:PSS Replacement in Organic Photovoltaic Cells
- Water Detoxification by a Substrate-Bound Catecholamine Adsorbent
- Water Processable Graphene Oxide

COMMERCIAL VALIDATION

- Cost-Effective Chalcogenide Polymers for Gas Separation and Heavy Metal Removal
- Decontamination of Radioactive Water Using a Novel Polymer for Ion Exchange
- **Gold Recovery from Halide Etchants**
- **Gold Recovery Process**
- **Nanoporous Materials for Gas Storage & Separation**
- **Process to Make Polymeric Materials**
- **Silicon Nanoparticles for Li Ion Anodes**

MATERIALS AND INDUSTRIAL PROCESSES PIPELINE

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RESEARCH	RESEARCH VALIDATION		COMMERCIAL VALIDATION	MARKET
Lead Selenophosphate Compound for X-Ray and γ-Ray Detection	Adhesive Hydrogels for Various Surgical Applications	Foam With Large Magnetic-Field-Induced Deformation	Acene-Based Organic Semiconductor Materials	Graphene Ink for Gravure Printing
Methods for Generating Substituted Imidazole Molecules	Atomic Force Photovoltaic Microscopy	Maskless Nano-Patterning	Bithiophene-Based Interfacial Layer for High-Efficiency Bulk-Heterojunction Organic Photovoltaic Cells	Graphene Ink for Screen Printing
Room Temperature Formable and Ductile Hexagonal Magnesium Alloys	Centrifugal Processing of Carbon Nanotubes and Graphene Oxide for Cement Composites	Materials for X-ray and Gamma Ray Detection-II	Bonding of Nickel-Based Alloy Wires by Forming an Aluminum-Titanium Coating	High Conductivity Graphene Inks
Synthesis of 2-Aryl Indoles	Combustion Processing for Metal Oxide Thin-Film Electronics	Mesoscale Metallic Pyramids with Nanoscale Tips	Ceramic Composite Design to Increase Toughness	**QUESTEK**
Synthesis of Privileged Seven-Membered Ring Molecules	Commercial-Scale Synthesis of p-Type Transparent Conductors	Metal Organic Frameworks Based on Azolium Salts	Concentration of Carbon Nanotubule Suspensions for Stronger Cement	**ZZYZX**
	Controlled Nanoscale Doping of Transparent Conducting Oxides by Focused Ion Beam Implantation	Method for Generation of Multifunctional Nanocomposites	Conductive and Transparent Thin Films	
	Cost-Effective Chalcogenide Polymers for Gas Separation and Heavy Metal Removal	Nanoscale Self-Assembled Organic Dielectrics for Ultra-Low Voltage High-Speed Devices	Controlling Charge Injection in OLEDs	
	DOPA-Melanin Films and Particles as Antimicrobial Compound Carriers and Heavy Metal Scavengers	Nanoscale Subsurface Imaging Method via Scanning Near-Field Ultrasound Holography	Crosslinkable Polymer Dielectrics	
	Efficient, Low-Cost Method for Isolation of Semiconducting SWCNTs	Nitrogen-Free Plant Polyphenol Derived Coatings	Desktop Micro Surface Texturing System	
	Fabrication Method for Large-Area, Light-Weight Optics	Novel and Inexpensive Light-Weight Mg Alloy with High Strength	**Electron-Blocking Layer for Organic Photovoltaics**	
	Flash Reduction of Graphic Oxide to Graphene	Chalcogenide Material for Metal Ion Capture in Continuous Bed Flow Columns	Extending Usable Life of Parts with Rapid Surface Texture Generation	
	Focalized Carrier Augmented Sensor	Novel Synthetic Route to Diazaperopyrenium Dication	**Graphene Oxide Paper**	
	Gas-Phase Metal Deposition in Metal-Organic Frameworks	Oligo(p-phenylene vinylene) Amphiphiles and Methods for Self-Assembly	Highly-Dispersed Carbon Nanotube-Reinforced Cement-Based Materials	
	High-Accuracy Double-Sided Incremental Forming	Separation of SWCNTs by Electronic Tube Using Biocompatible Block Copolymers	Low-Temperature Fabrication of Metal Composite Thin Films	
	High-Throughput Imaging of Graphene Based Sheets by Fluorescence Quenching Microscopy	Sorting Two-Dimensional Nanomaterials Using Density Differentiation	Majority Graphene 3D-Printed Composites for Electronic and Biomedical Applications	
	Highly Concentrated Graphene Solutions via Iterative Solvent Exchange	Stress Manipulated Coating for Figure Reshape of Optics Mirrors	**Materials to Recover Gold**	
	Hydrogel Dressing with Controlled Ion Release Properties for Wound Healing	**Substrate-Independent Anticoagulant and Antibacterial Coatings**	Method of Epitaxial Growth of MgO on Si(100) Using a SiC Interlayer	
	Improved Monodispersity of Core/Shell Nanoparticles via Centrifugal Processing	Supported Catalysis for *in situ* Synthesis of High Energy Density Nanocomposites	Nanocantilever Bistable Tunneling Proximity Sensor/Probe	
	Improving Efficiency and Productivity of Titania Catalysts with Graphene	Thickness Sorting of Two-Dimensional Nanomaterials	**Nanoporous Materials for Gas Storage & Separation**	
	Large-Area Subwavelength Hole Arrays	Thin Film Waveguide Modulator with an Increased Electro-Optic Coefficient and Wider Bandwidth	New Hole Transport Layer Materials for Polymer Light Emitting Diodes	
	Laser-Assisted Field-Induced Oxide Nanopatterning	Tri-Pyramid Robot: A Novel 3-DOF Translational Parallel Manipulator	Novel Intercalated Superlattices with Modulating Dielectric Properties	
	Laser-Induced Plasma Micromachining (LIPMM)	Water Processable Graphene Oxide	Organic Electro-Optic Chromophores with Superior Hyperpolarizability	
	Magnetic Shape-Memory		Organic Hosts Covalently Bonded to Silicate Matrices for Separations, Catalysis and Remediation	
			Photocatalytic Composite for Organic Chemical Oxidation	
			Polymerization onto Metal Oxide Particles	
			Porous Nanocrystalline Materials	
			Self-Assembled Nanodielectrics with Improved Leakage Protection	
			Silicon Nanoparticles	
			Silole-Containing Polymers	
			Stable Dispersions of Graphitic Nanoplatelets via Reduction	
			Substrate-Independent Adhesive Polymer Coating Based on Mussel Adhesive Proteins	
			TFB:TPDSi2 Interfacial Layer as a PEDOT:PSS Replacement in Organic Photovoltaic Cells	
			Transparent Nanowire Transistors	
			Vacuum-Assisted Self-Assembly for the Creation of Layered Nanocomposites	

SOFTWARE AND SERVICES PIPELINE

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RESEARCH	RESEARCH VALIDATION	COMMERCIAL VALIDATION	MARKET
Physical and Medium Access Control Layers of Peer-to-Peer Networks	AutoLum: Automatic Camera and Display Calibration Algorithm by Optical Feedback	AutoCog: Description-to-Permission Fidelity Software	**Administrative Network Manager**
	Efficient Incremental Algorithm for Minimum Area Retiming	Equalization Preference Learning Algorithm	**Advanced Encryption System**
	Fourier-Domain Mobility Spectrum Analysis (FMSA)	MAT2C: A MATLAB-to-C Translator	**Algorithm to Design High Performance Steel & Alloys**
	Interactive Chef	REPET (REpeating Pattern Extraction Technique)	AppShield: A Proxy-Based Data Access Mechanism in Enterprise Mobility Management
	Low Cost Sensing and Communication System for Rotorcraft	SAFE (Situational Awareness for Events)	**Artificial Intelligence & Writing**
	MINT (Materials Interface)	Sequential Action Control for Efficient Predictive Optimal Control	**Digital Language Labs**
	More Efficient and Economical Technique for Microscopy Image Acquisition	Six Degrees of Separation	**Integrated Scheduling Software**
	Net Theater: Dynamically Constructing Theatrical Experiences from Online Content	Social Media-Based Preference Determination and Recommendation	**Intelligent Audio Software**
	Novel Logic Encryption Designs for Integrated Circuits Protection	Twitter Profiling/Mindshare	**Marketing Algorithm Based on Social Media**
	Private Data Networks: Federated Databases for Mutually Distrustful Data Providers	Uranine: Real-Time Privacy Leakage Detection and Prevention	**Optimization Software**
	Radio Resource Management in Large Wireless Networks		**Street Level IP Geolocation Technology**
	System and Method for Multi User Two-Way Ranging		SynthAssist: Efficient Audio Synthesis Using Vocal Imitation
	User-Driven Indoor Visibility Localization with Wayfinding		
	VirtualCar: Computational Simulation of Self-Propelling Automobiles		

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INNOVATION AND NEW VENTURES

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