



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

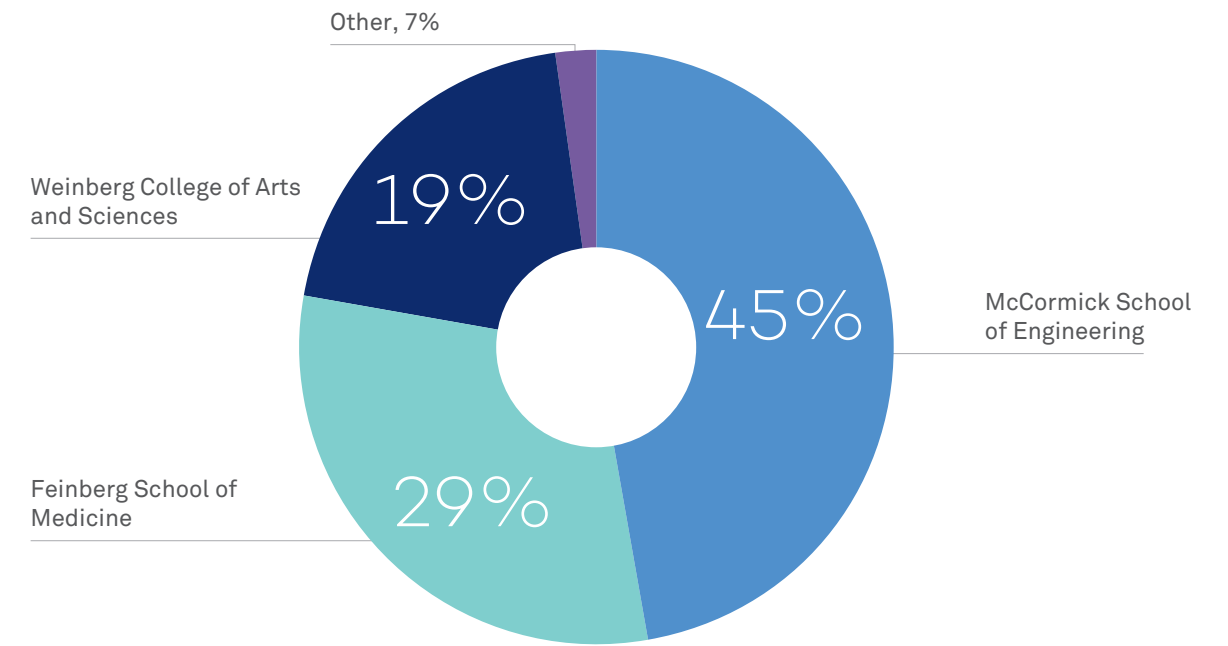
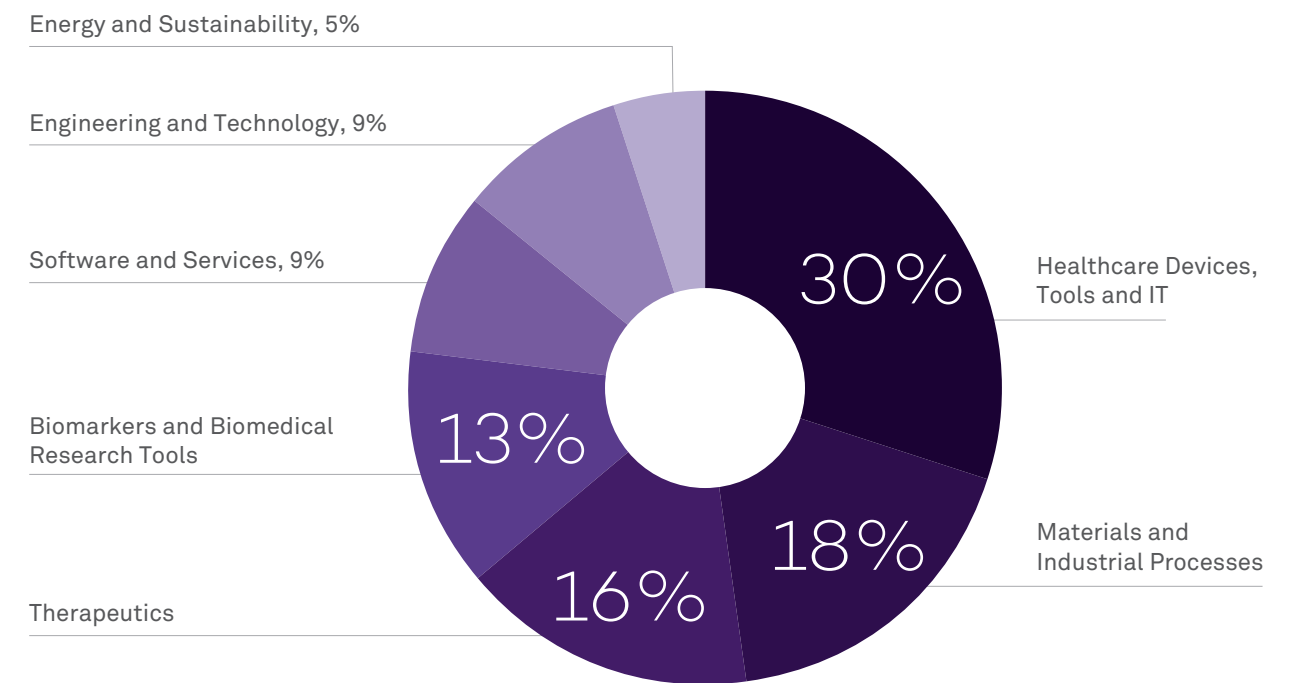


Figure 3. Inventions by category





“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

ADDING VALUE TO PROPEL COMMERCIALIZATION

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*

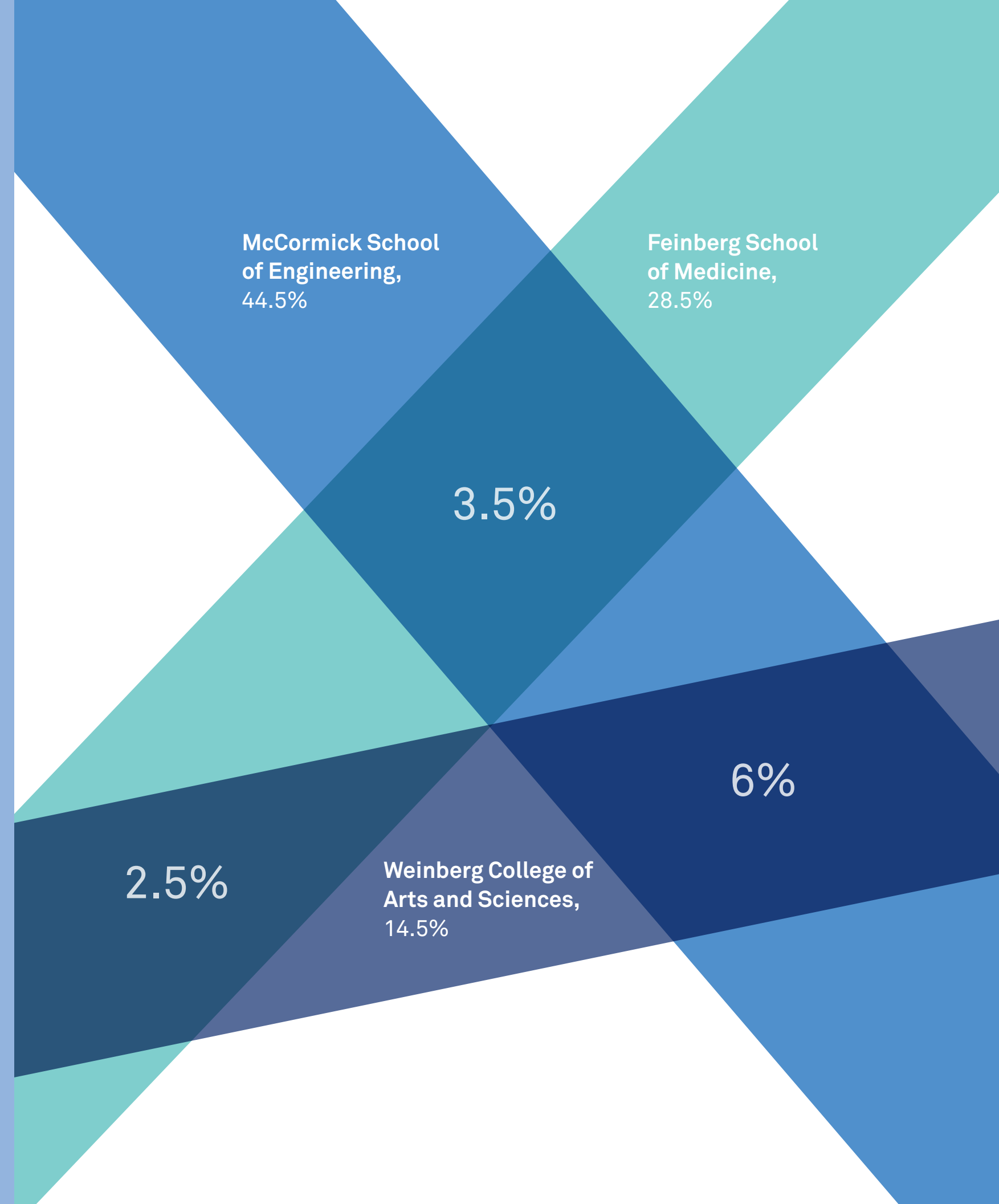
Regulatory Support

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

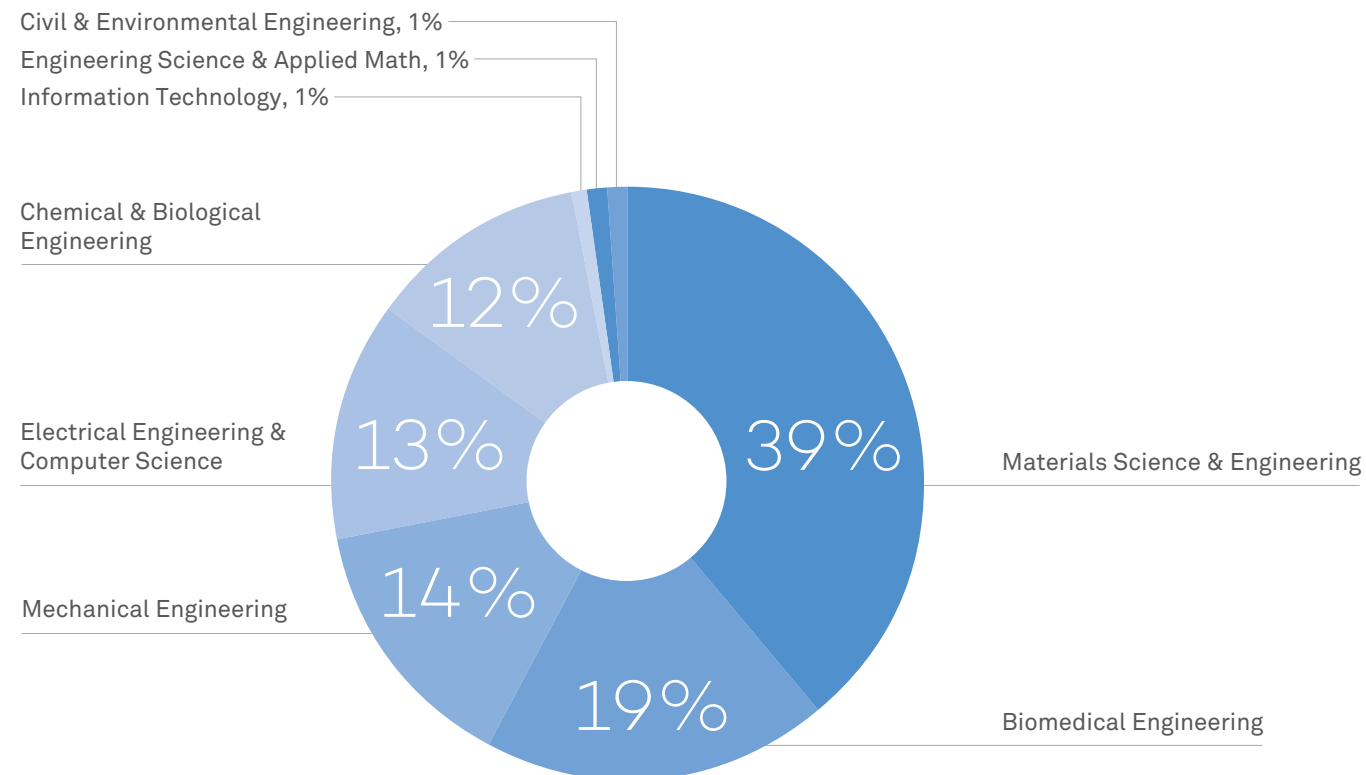


Figure 6. Feinberg School of Medicine inventions by department

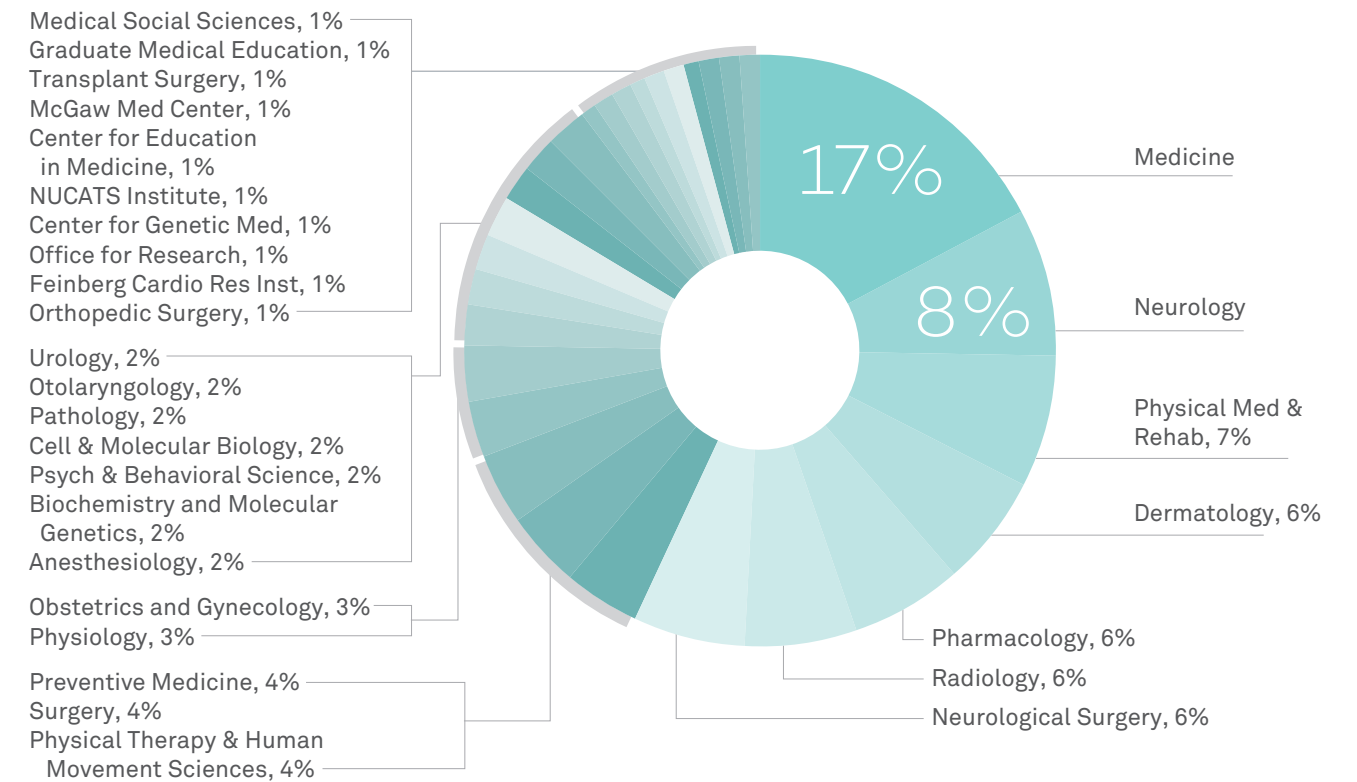
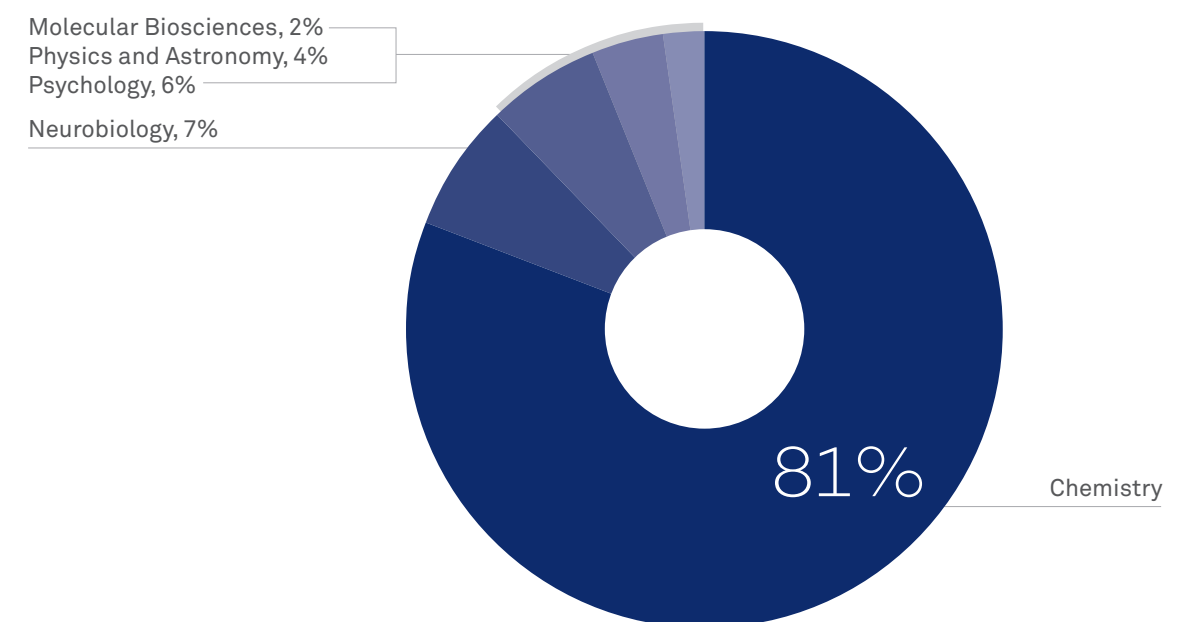


Figure 7. Weinberg College of Arts and Sciences inventions by department





WHY NORTHWESTERN CHAMPIONS STUDENT ENTREPRENEURSHIP

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

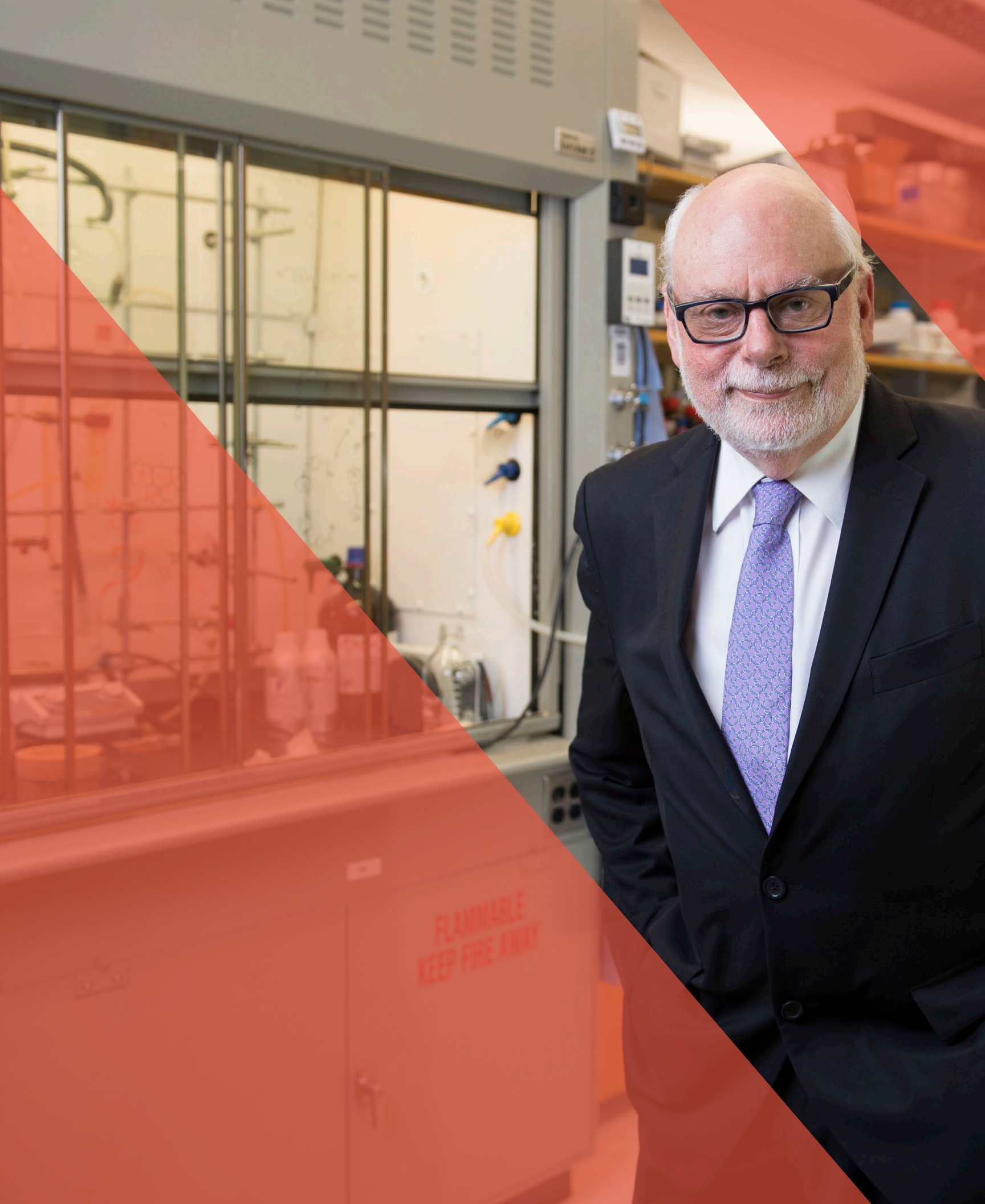
academic experience beyond the classroom and provide practical life skills such as empathy, resiliency, persistence, and resourcefulness that will enrich and power students' lives.

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 to 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

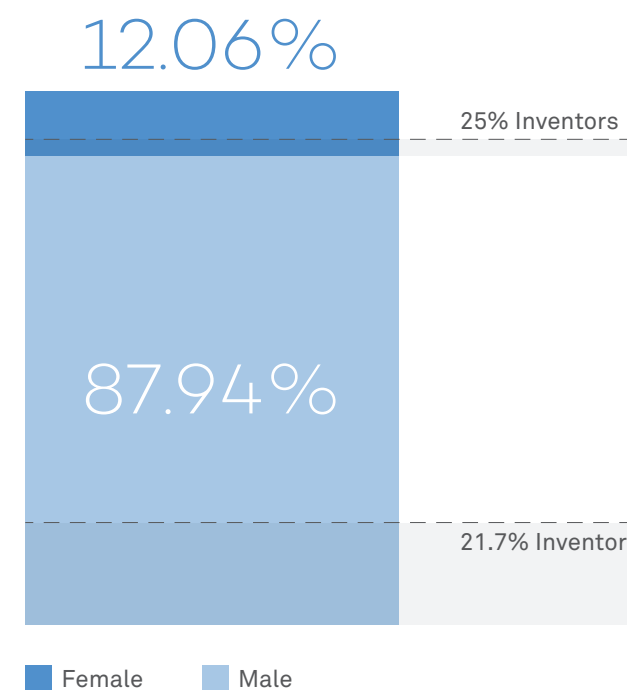


Figure 9. Feinberg School of Medicine inventors among tenured and tenure-eligible faculty

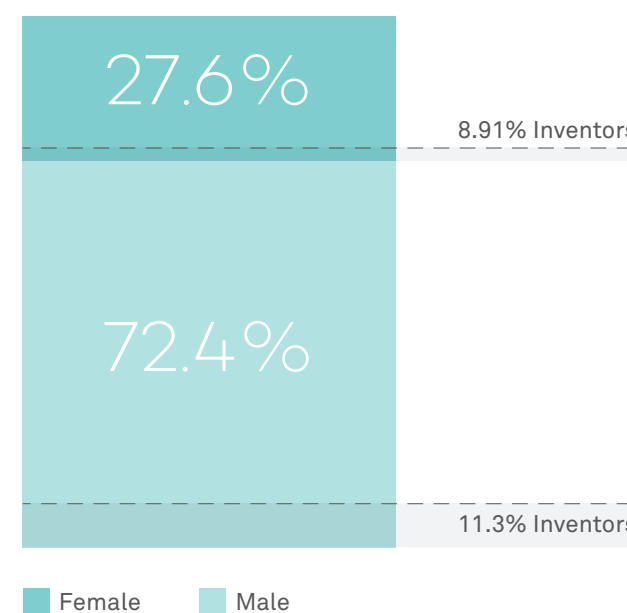
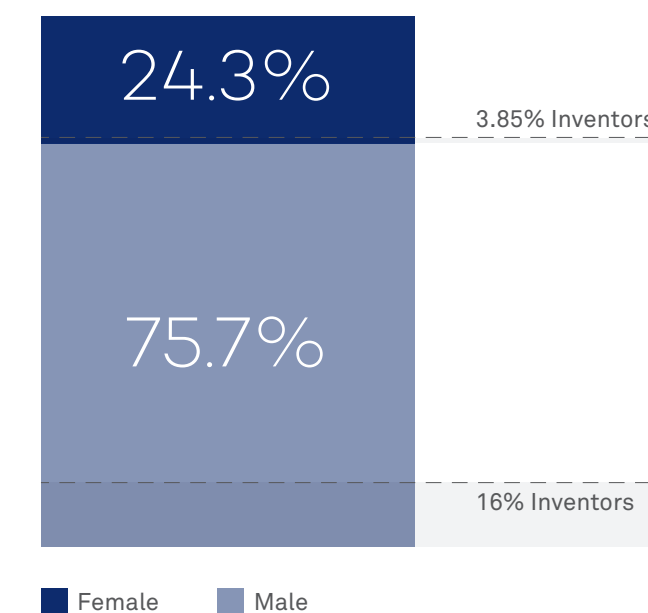


Figure 10. Weinberg College of Arts and Sciences inventors among tenured and tenure-eligible faculty





EXPANDING THE LOCAL ENTREPRENEURIAL ECOSYSTEM— AND WHY IT IS GOOD FOR NORTHWESTERN

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 ecosystem 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 discov-

eries 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 Georganopoulou, 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

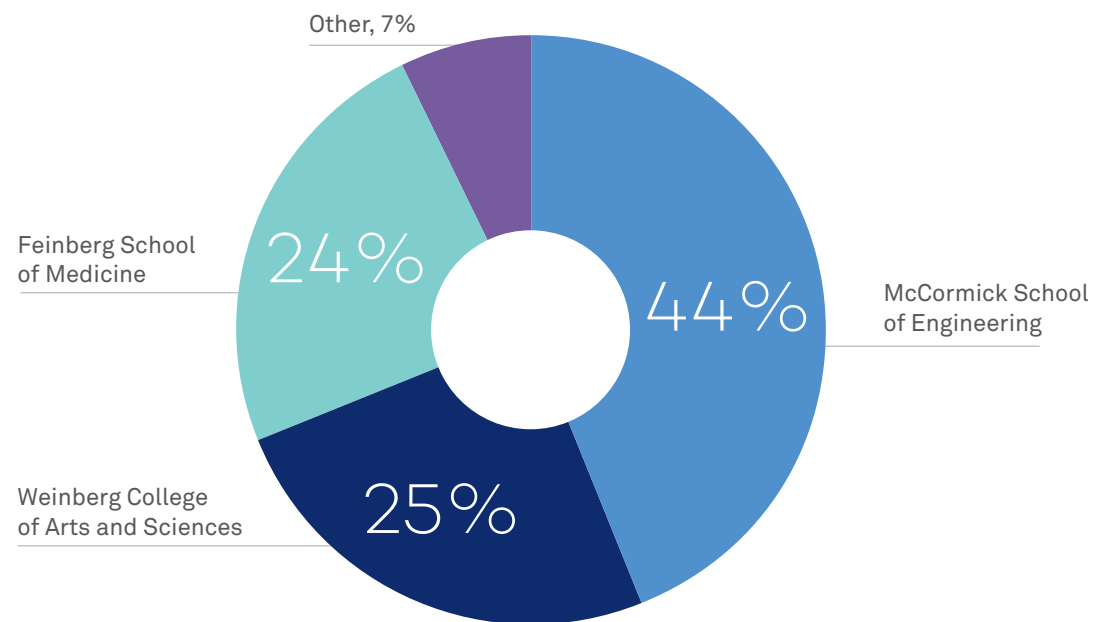


Figure 12. Filed patent applications by type

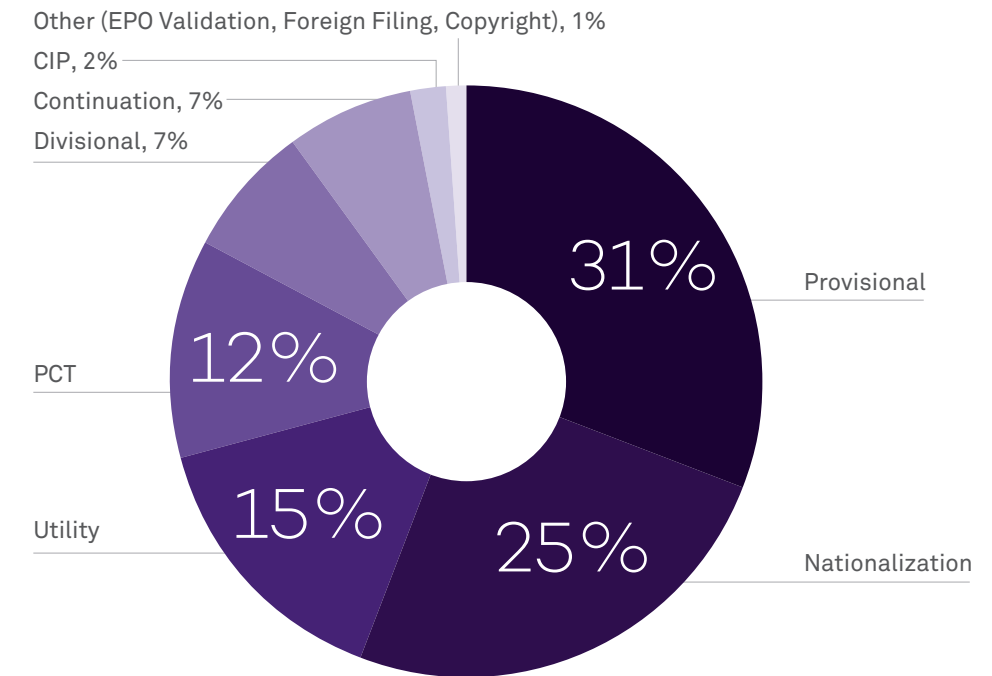
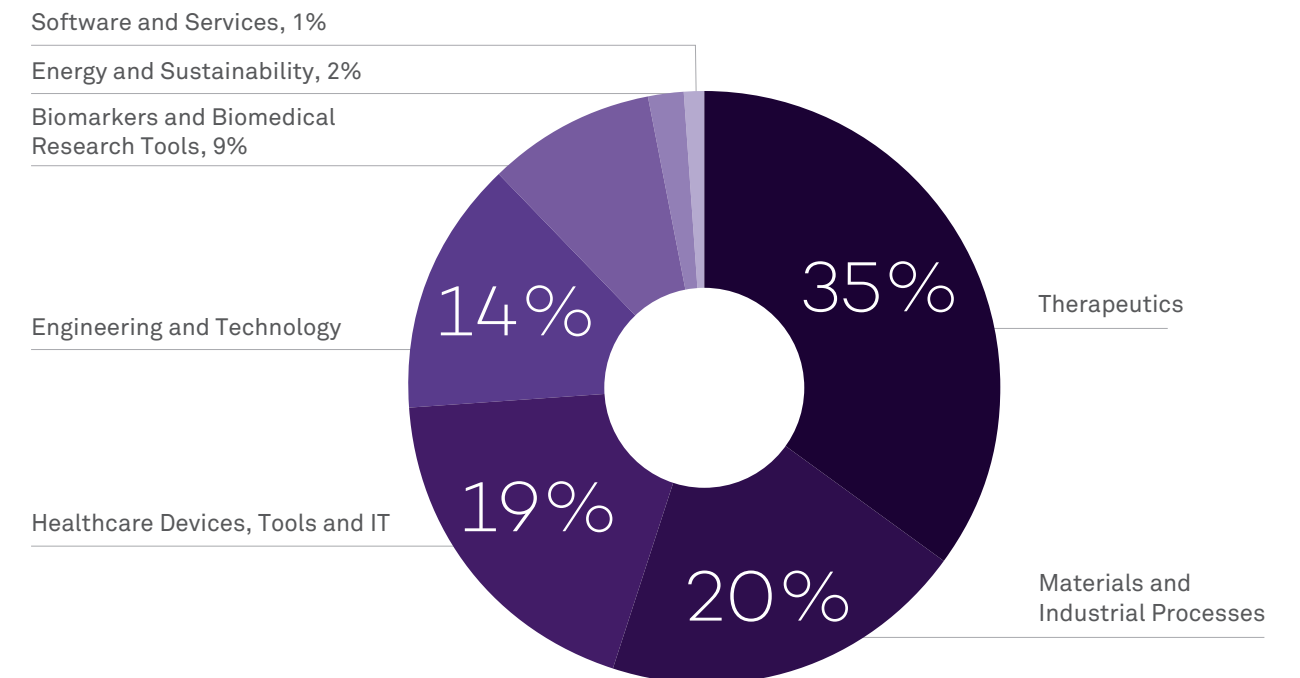
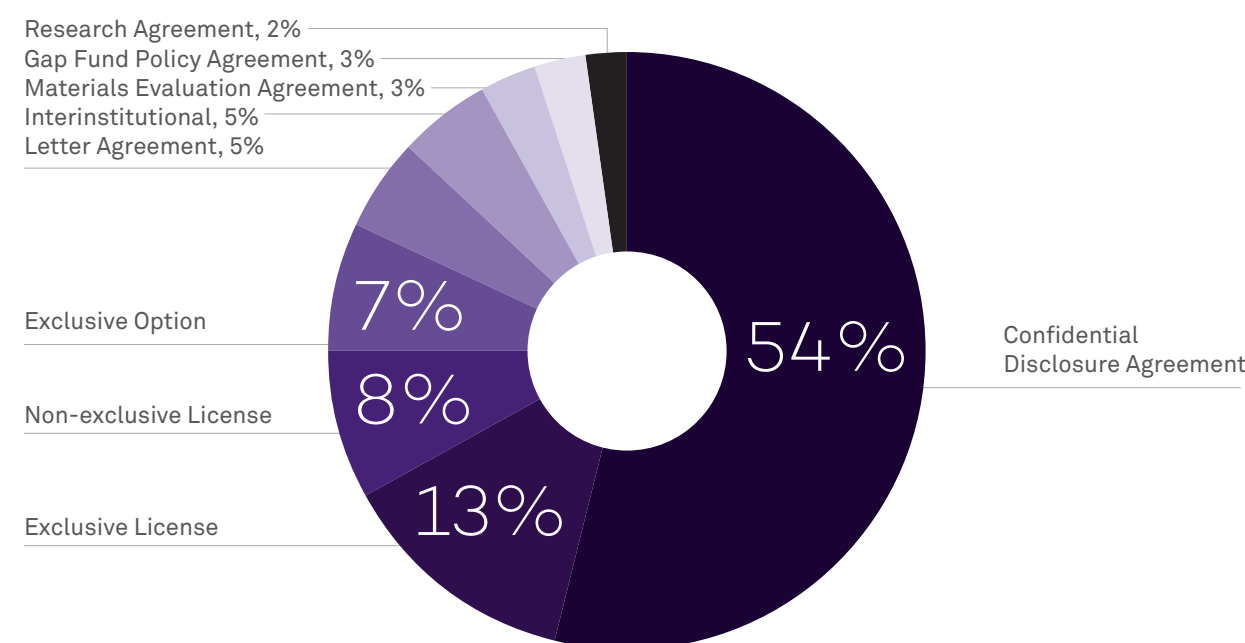


Figure 13. Issued patent applications by category



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

Figure 14. Agreements by type



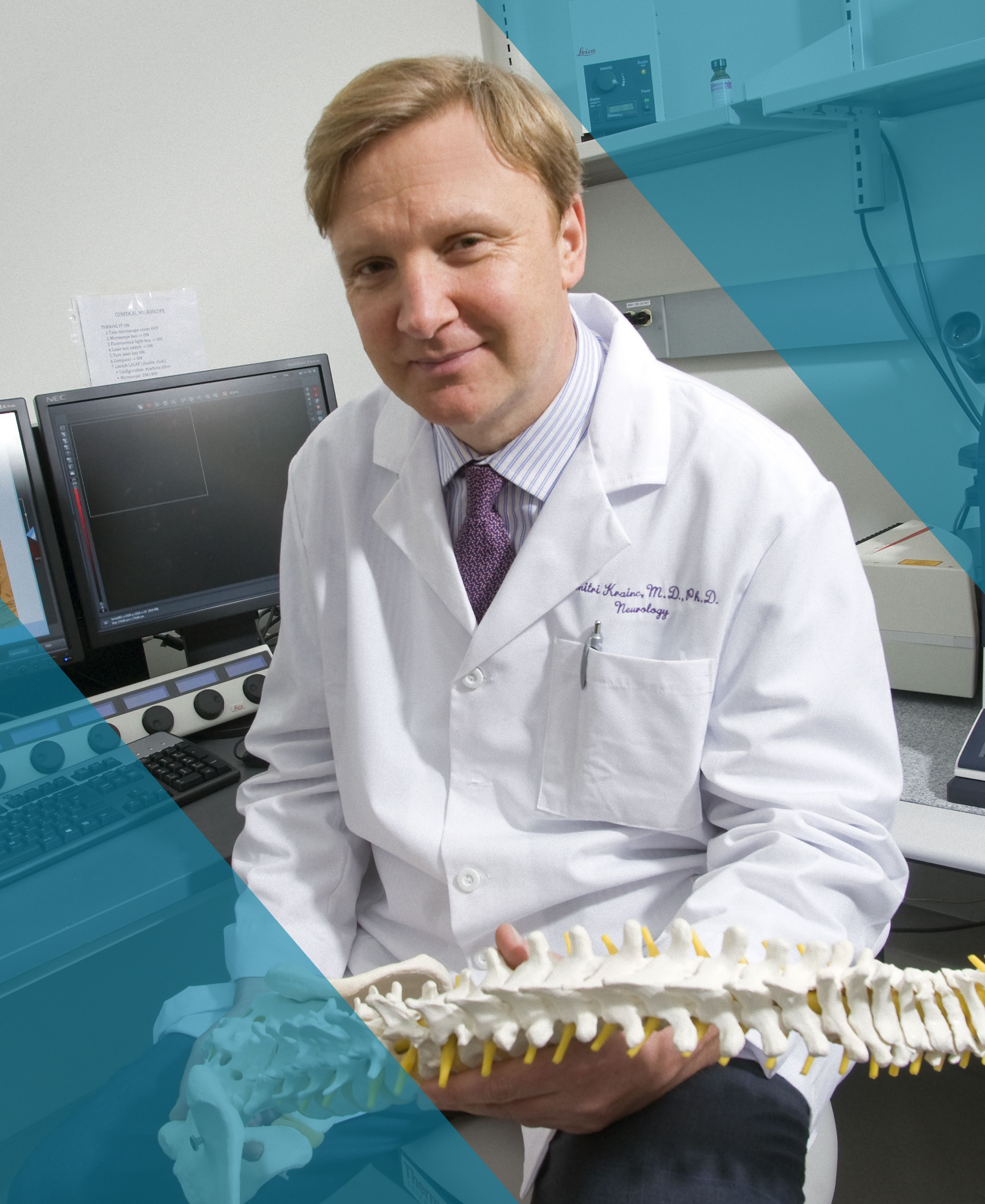
INVO executed 210 agreements during FY17, representing a 24% growth compared to FY16 and more than two and a half times the agreements in FY15. Agreements ranged from interinstitutional agreements to material evaluation agreements and licenses.

The volume of agreements signals a continuing growing external interest in Northwestern's inven-

tions. 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**

U**PWARDS 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

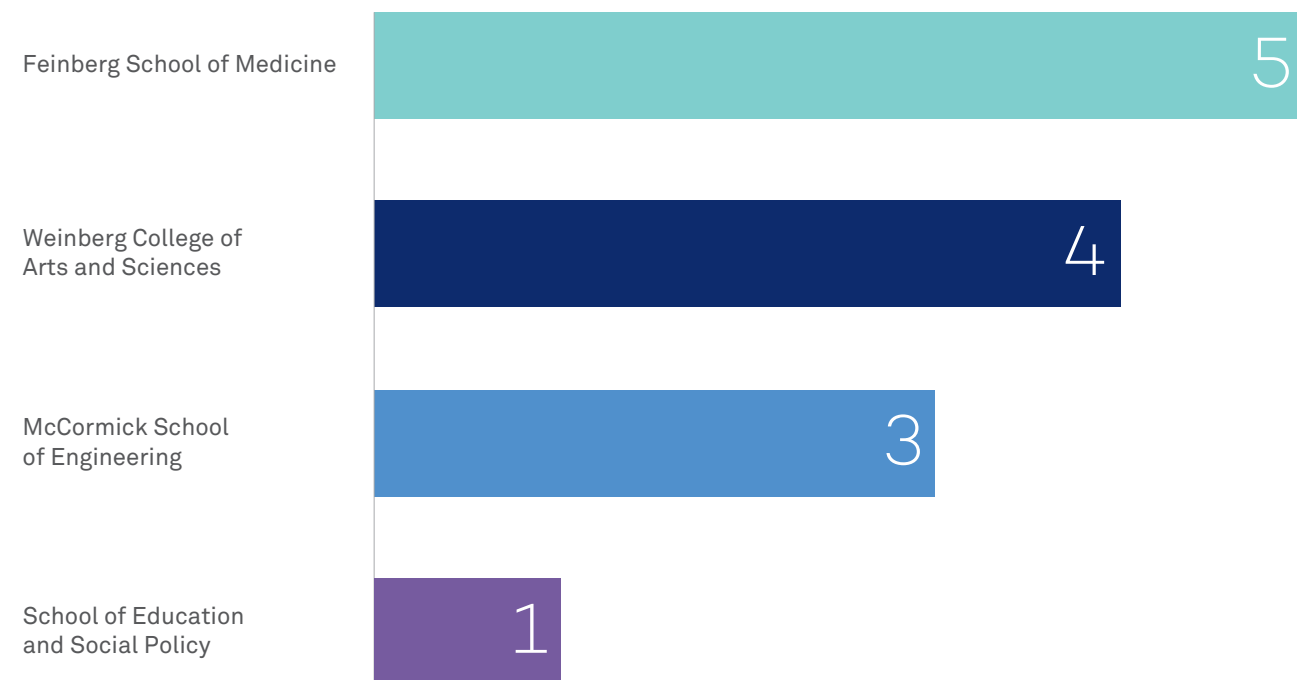


Figure 18. FY17 Startups



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 Neuron 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](#)

CONCEPT	LABORATORY PROTOTYPE	COMMERCIAL PROTOTYPE	HUMAN TESTING	APPROVAL AND MARKETING	NEW TARGETS	HIT TO LEAD	LEAD OPTIMIZATION	PRE-CLINICAL DEVELOPMENT	CLINICAL TRIALS	APPROVAL
3D Printed Intraocular Lens	3D Printed Soy Scaffolds	Metabolic Optical Coherence Tomography	3D Suture	Mobile Apps for Depression and Anxiety	Anti Inflammatory Antibodies	AMPA Receptor Antagonists: Neurologic Diseases	β lactamase Inhibitors: Antibiotics	Alzheimer Immunotherapy	Antisense Molecules	Lyrica: Fibromyalgia
3D Printing of Endovascular Stents	Adaptable Ankle Foot Prosthesis	Poly (Diol-Co-Citrate) Hydroxyapatite Composite	AF Electrogram Analytics Software	Cement Mixer	Antibiotic-Coated Nanoparticles	CD154 Trimer Stabilization: Immunity	Bladder Regeneration	Bladder Regeneration	Gene Regulation with NP-Nucleic Acid	
A Novel Hydroxyapatite Composite	Adhesive Hydrogels for Surgery	Micro Drug Delivery Device	AF Peak Detection	Northwestern Anagram Test (NAT)	Bacterial NOS Inhibitors as Antibiotics	Compounds against Nodal Pathway (CA)	Gene Silencing Enhancers	Chronic Pelvic Pain Vaccine	GLYX-13: Depression and Pain	
Analysis of Multiplexed Bead-Based Assays	Anthrax Detection	Ankle Prosthesis	Atrial Fibrillation Diagnostic	Northwestern Assessment of Verbs & Sentences (NAVS)	Chromatin Therapy to Sensitize CA Cells	Compounds for CNS Diseases	Gene Therapy: Atrial Fibrillation	E. Coli Isolated from Human Prostate	Lead Compounds for Neurodegeneration and Neuroinflammation	
Cartilage Coupled Peptide Polymers	Anti-Microbial Hydrogel Coatings	Automated fMRI for Clinic	Bedside Wound Pulse Lavage	Northwestern Naming Battery (NNB)	CXCR4 Modulators	Compounds for Neurologic Disorders	Glucocerebrosidase Modulators	Flavanones & Chromanones: Cancer	Metallophile Technology: Cancer	
Catheter for Gene Therapy	App for Movement Disorders	Brain Wave Processing to Enhance Sleep	CA Diagnostic with Microscopy	Rehabilitation Devices	Exosomes: Cholesterol Modulation	Epstein-Barr Virus Inhibitors	GLUT Antagonists: Cancer 2	GABA Aminotransferase Inhibitors	Metallophile Technology: ID	
Extracellular Matrix with Anticoagulant Properties	Arsenoplatins for Cancer Treatment	Cell Therapy for Diabetes	Endoscopic CA Diagnostic	Treatment of Underlying Forms (TUF)	Female Fertility Treatment	FFAR2 Agonists: Type 2 Diabetes	GLUT Antagonists: Cancer 1	GABA Analogues: Hepatocellular Cancer	NMDAR Modulators	
Imaging & Therapeutic Nanoconjugates	Artificial Blood Capillary Beds	Central Line Insertion Training Curriculum	Hearing Aid Interface		FGF23 Normalizing Methods	Flufenamic Acid for Chronic Pain	Herpes Virus Vaccine and Oncolytic Vectors	Glycosides for Cancer	Organ Transplantation	
Left Atrial Appendage Occluder Device	Atrial Fibrillation Electrograms	Diaphragm-Based Hybrid Prosthetic Vacuum Pump	HIV Diagnostics		Gene Therapy: Anti-Depression	G Protein Inhibitors: Cardiovascular	Inflammation Modulator	Human Melanoma	Small Molecules for Tourettes Syndrome	
Microfluidic Device for Detection of Circulating Tumor Cells	Biocompatible Hydrogels	Diaphragm-Based Hybrid Prosthetic Vacuum Pump	Medical Adhesives		HDL-Like Nanoparticles: Inflammation	HIV Therapeutics	Inhibitors for Triple Negative Breast Cancer	Isradipine: Parkinson's	Treatments for Traumatic Brain Injury	
Nanostructures for Alzheimer's Diagnosis	Biodegradable Drug Delivery	Evaluating Impact of Oxidative Stress on AF Electrograms	Pre-Free Colon CA Screening		Hydrogel Wound Dressing with Cu Ions	Ion Channel Manipulation: Parkinson's	Inhibitors: Leukemia	Liposome Coated Nanostructures	Timp-Celiac Disease	
Scar-Free Tissue Regeneration	Cardiac Tissue Ablation	Flexible Electronic Medical Device	Rehabilitation Robotics		Immuno-therapy: Macular Degeneration	Maspin: Bone Disorders	Kinase Inhibitors	Medical Food		
Sealants for Fetal Membrane Repair	Chamber for <i>in situ</i> Wound Healing	Gas Sensor for Smart Chest Tube Drainage			Kinase Inhibitors: Cancer	Megakaryocytic Leukemia Treatment	Malaria Prophylaxis	Method to Control Dopaminergic Neuron Pacemaking		
Self Assembled Bioadhesives	Coupling Therapeutic Agents to Tissues	Hearing Test			MAPK Compounds: CNS Disorders	Megamolecule Synthetic Antibodies	Maspin Protein Mimics for Cancer Treatment	Nanodiamonds for Imaging and Drug Delivery		
	Diabetes Matrices	Implantable Biomedical Sensors			MLCK Inhibitors	Peptides for PEDF	Nanoparticulate Arsenic	Neurodegenerative Compounds		
	DOPA Nanoparticles	Liquid Cast Biodegradable Drug Delivering Arterial Stent			Pro-Drugs: <i>Streptococcus</i>	Peptides: Cancer	Platinum Drugs	Nitric Oxide Synthase Inhibitors		
	Electronic Biochip System	Mammary Prosthesis			Scar-Free Tissue Regeneration	Peptides: Cancer	Neurodegenerative Disease Therapy	NOS Targeting: Neurodegeneration		
	Electronic Biochip System with Feedback	Motorized Software: Controlled Calibrator			Screen for Covalent Drugs	Peptides: Cancer	Neuroprotective Therapeutics	Numonafide: Cancer Therapy		
	<i>Ex Vivo</i> Female Reproductive System	MRI-Perfusion and Diffusion Mismatch			Sirtuin Inhibitors	Plaque Digestion: Cardiovascular	Peptides: Neurodegeneration	Peptide Vaccine for Lupus		
	Extra-Strength Hydrogel Adhesives	MRI-Perfusion and Diffusion Mismatch			Thermoresponsive Adhesive Dressing	Potential New Modulator of Angiogenesis	Small Molecules: Parkinson's Disease	Peptide-Coupled Nanoparticles		
	ECM with Anticoagulant Properties for Tissue Engineering	Nanodiamond Conjugates				Small Molecule Antiviral Therapy	Triggered Release Arsenic: Cancer	Peptides: Immune Tolerance		
	Female Fertility Test	Neonatal Abdominal Surgery Trainer				Small Molecules against ALS		Preventing Allograft Rejection		
	Heavy Metals in Dried Blood Spots	Optical and Acoustic Imaging				Soft Materials for Bioprinting		Preventing Scar Formation		
	Hydrogels for Improved Tissue Graft Survival	Partition Layer for Raman Nanobiosensor				Stem Cell Signaling Molecules for Cancer Therapies		Preventing UTI Symptoms		
	<i>In Vivo</i> Raman Glucose Sensor	Photodetector for Infrared Imaging				TGF β Inhibitor Transgene		Scaffolds for nNOS Inhibition		
	iSOCT	Point of Care Diagnostics				Therapeutic Exosomes		Self-Assembling Nanovirus		
	IVC Filter Removal	Quantification of Cerebral Perfusion				Urinary Tract Infection Vaccine		Sensitization to Steroids		
	Left Ventricular Apex Surgical Technology	Raman Biosensor for Multianalyte Detection						Small Molecule: Liver Cancer		
	Low Power Cochlear Implant	Raman Spectroscopy for Anthrax Detection						Small Molecule: Cancer Therapy		
	Macromolecular MRI Contrast Agents	RF Ablation Probe						Small Molecules against Hepatocellular Carcinoma		
	Materials that Promote Bone Regeneration	SERS Sensor for Lactate						Small Molecules: CNS Spherical Nucleic Acids: Gene Regulation		
	Membrane Coatings pH Sensitive Anticancer Drug Delivery	Silica Polymer Pen Lithography						Statin for Hearing Loss Prevention & Therapy		
	Intrinsic-Contrast Super-Resolution Optical Microscope	SNR Improvements for Multi-Slice MRI						Tau Monoclonal Antibodies		
		Substrate-Independent Adhesive Coating						Topical Wound Treatment VEGF Mimic to Treat Ischemia		
		Virtual Electrophysiologic Test						Wound Healing with Antisense Molecules		
		Vocal Cord Medialization								

HEALTHCARE DEVICES, TOOLS AND IT PIPELINE

Available for License [Non-Exclusive License/Option](#) [Exclusive License/Option](#)

THERAPEUTICS PIPELINE

Available for License [Non-Exclusive License/Option](#) [Exclusive License/Option](#)

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](#)
[Antiamipolar 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](#)

COMMERCIAL VALIDATION

[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](#)

MARKET

[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](#)

[Graphene Ink for Gravure Printing](#)

[High Conductivity Graphene Inks](#)

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](#)

COMMERCIAL VALIDATION

[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](#)

[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](#)

RESEARCH ► RESEARCH VALIDATION

Lead Selenophosphate Compound for X-Ray and γ -Ray Detection

Methods for Generating Substituted Imidazole Molecules

Room Temperature Formable and Ductile Hexagonal Magnesium Alloys

Synthesis of 2-Aryl Indoles

Synthesis of Privileged Seven-Membered Ring Molecules

Adhesive Hydrogels for Various Surgical Applications

Atomic Force Photovoltaic Microscopy

Centrifugal Processing of Carbon Nanotubes and Graphene Oxide for Cement Composites

Combustion Processing for Metal Oxide Thin-Film Electronics

Commercial-Scale Synthesis of p-Type Transparent Conductors

Controlled Nanoscale Doping of Transparent Conducting Oxides by Focused Ion Beam Implantation

Cost-Effective Chalcogenide Polymers for Gas Separation and Heavy Metal Removal

DOPA-Melanin Films and Particles as Antimicrobial Compound Carriers and Heavy Metal Scavengers

Efficient, Low-Cost Method for Isolation of Semiconducting SWCNTs

Fabrication Method for Large-Area, Light-Weight Optics

Flash Reduction of Graphitic Oxide to Graphene

Focalized Carrier Augmented Sensor

Gas-Phase Metal Deposition in Metal-Organic Frameworks

High-Accuracy Double-Sided Incremental Forming

High-Throughput Imaging of Graphene Based Sheets by Fluorescence Quenching Microscopy

Highly Concentrated Graphene Solutions via Iterative Solvent Exchange

Hydrogel Dressing with Controlled Ion Release Properties for Wound Healing

Improved Monodispersity of Core/Shell Nanoparticles via Centrifugal Processing

Improving Efficiency and Productivity of Titania Catalysts with Graphene

Large-Area Subwavelength Hole Arrays

Laser-Assisted Field-Induced Oxide Nanopatterning

Laser-Induced Plasma Micromachining (LIPMM)

Magnetic Shape-Memory

► RESEARCH VALIDATION ► COMMERCIAL VALIDATION

Foam With Large Magnetic-Field-Induced Deformation

Maskless Nano-Patterning Materials for X-ray and Gamma Ray Detection-II

Mesoscale Metallic Pyramids with Nanoscale Tips

Metal Organic Frameworks Based on Azolium Salts

Method for Generation of Multifunctional Nanocomposites

Nanoscale Self-Assembled Organic Dielectrics for Ultra-Low Voltage High-Speed Devices

Nanoscale Subsurface Imaging Method via Scanning Near-Field Ultrasound Holography

Nitrogen-Free Plant Polyphenol Derived Coatings

Novel and Inexpensive Light-Weight Mg Alloy with High Strength

Chalcogenide Material for Metal Ion Capture in Continuous Bed Flow Columns

Novel Synthetic Route to Diazaperopyrenium Dication Oligo(p-phenylene vinylene) Amphiphiles and Methods for Self-Assembly

Separation of SWCNTs by Electronic Tube Using Biocompatible Block Copolymers

Sorting Two-Dimensional Nanomaterials Using Density Differentiation

Stress Manipulated Coating for Figure Reshape of Optics Mirrors

Substrate-Independent Anticoagulant and Antibacterial Coatings

Supported Catalysis for *in situ* Synthesis of High Energy Density Nanocomposites

Thickness Sorting of Two-Dimensional Nanomaterials

Thin Film Waveguide Modulator with an Increased Electro-Optic Coefficient and Wider Bandwidth

Tri-Pyramid Robot: A Novel 3-DOF Translational Parallel Manipulator

Water Processable Graphene Oxide

► COMMERCIAL VALIDATION ► MARKET

Acene-Based Organic Semiconductor Materials

Bithiophene-Based Interfacial Layer for High-Efficiency Bulk-Heterojunction Organic Photovoltaic Cells

Bonding of Nickel-Based Alloy Wires by Forming an Aluminum-Titanium Coating

Ceramic Composite Design to Increase Toughness

Concentration of Carbon Nanotubule Suspensions for Stronger Cement

Conductive and Transparent Thin Films

Controlling Charge Injection in OLEDs

Crosslinkable Polymer Dielectrics

Desktop Micro Surface Texturing System

Electron-Blocking Layer for Organic Photovoltaics

Extending Usable Life of Parts with Rapid Surface Texture Generation

Graphene Oxide Paper

Highly-Dispersed Carbon Nanotube-Reinforced Cement-Based Materials

Low-Temperature Fabrication of Metal Composite Thin Films

Majority Graphene 3D-Printed Composites for Electronic and Biomedical Applications

Materials to Recover Gold

Method of Epitaxial Growth of MgO on Si(100) Using a SiC Interlayer

Nanocantilever Bistable Tunneling Proximity Sensor/Probe

Nanoporous Materials for Gas Storage & Separation

New Hole Transport Layer Materials for Polymer Light Emitting Diodes

Novel Intercalated Superlattices with Modulating Dielectric Properties

Organic Electro-Optic Chromophores with Superior Hyperpolarizability

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

► MARKET

Graphene Ink for Gravure Printing

Graphene Ink for Screen Printing

High Conductivity Graphene Inks

QUESTEK

ZZYZX

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

Efficient Incremental Algorithm for Minimum Area Retiming

Fourier-Domain Mobility Spectrum Analysis (FMSA)

Interactive Chef

Low Cost Sensing and Communication System for Rotorcraft

MINT (Materials Interface)

More Efficient and Economical Technique for Microscopy Image Acquisition

Net Theater: Dynamically Constructing Theatrical Experiences from Online Content

Novel Logic Encryption Designs for Integrated Circuits Protection

Private Data Networks: Federated Databases for Mutually Distrustful Data Providers

Radio Resource Management in Large Wireless Networks

System and Method for Multi User Two-Way Ranging

User-Driven Indoor Visibility Localization with Wayfinding

VirtualCar: Computational Simulation of Self-Propelling Automobiles

AutoCog: Description-to-Permission Fidelity Software

Equalization Preference Learning Algorithm

MAT2C: A MATLAB-to-C Translator

REPET (REpeating Pattern Extraction Technique)

SAFE (Situational Awareness for Events)

Sequential Action Control for Efficient Predictive Optimal Control

Six Degrees of Separation

Social Media-Based Preference Determination and Recommendation

Twitter Profiling/Mindshare

Uranine: Real-Time Privacy Leakage Detection and Prevention

► RESEARCH VALIDATION

Administrative Network Manager

Advanced Encryption System

Algorithm to Design High Performance Steel & Alloys

AppShield: A Proxy-Based Data Access Mechanism in Enterprise Mobility Management

Artificial Intelligence & Writing

Digital Language Labs

Integrated Scheduling Software

Intelligent Audio Software

Marketing Algorithm Based on Social Media

Optimization Software

Street Level IP Geolocation Technology

SynthAssist: Efficient Audio Synthesis Using Vocal Imitation

► COMMERCIAL VALIDATION

Administrative Network Manager

Advanced Encryption System

Algorithm to Design High Performance Steel & Alloys

AppShield: A Proxy-Based Data Access Mechanism in Enterprise Mobility Management

Artificial Intelligence & Writing

Digital Language Labs

Integrated Scheduling Software

Intelligent Audio Software

Marketing Algorithm Based on Social Media

Optimization Software

Street Level IP Geolocation Technology

SynthAssist: Efficient Audio Synthesis Using Vocal Imitation

► MARKET

Administrative Network Manager

Advanced Encryption System

Algorithm to Design High Performance Steel & Alloys

AppShield: A Proxy-Based Data Access Mechanism in Enterprise Mobility Management

Artificial Intelligence & Writing

Digital Language Labs

Integrated Scheduling Software

Intelligent Audio Software

Marketing Algorithm Based on Social Media

Optimization Software

Street Level IP Geolocation Technology

SynthAssist: Efficient Audio Synthesis Using Vocal Imitation

MATERIALS AND INDUSTRIAL PROCESSES PIPELINE

Available for License [Non-Exclusive License/Option](#) [Exclusive License/Option](#)

SOFTWARE AND SERVICES PIPELINE

Available for License [Non-Exclusive License/Option](#) [Exclusive License/Option](#)

Northwestern | INVO

INNOVATION AND NEW VENTURES

invo.northwestern.edu

@INVOatNU

1800 Sherman Avenue, Suite 504
Evanston, IL 60201