



VANDERBILT
Center for Technology Transfer
and Commercialization

VANDERBILT UNIVERSITY

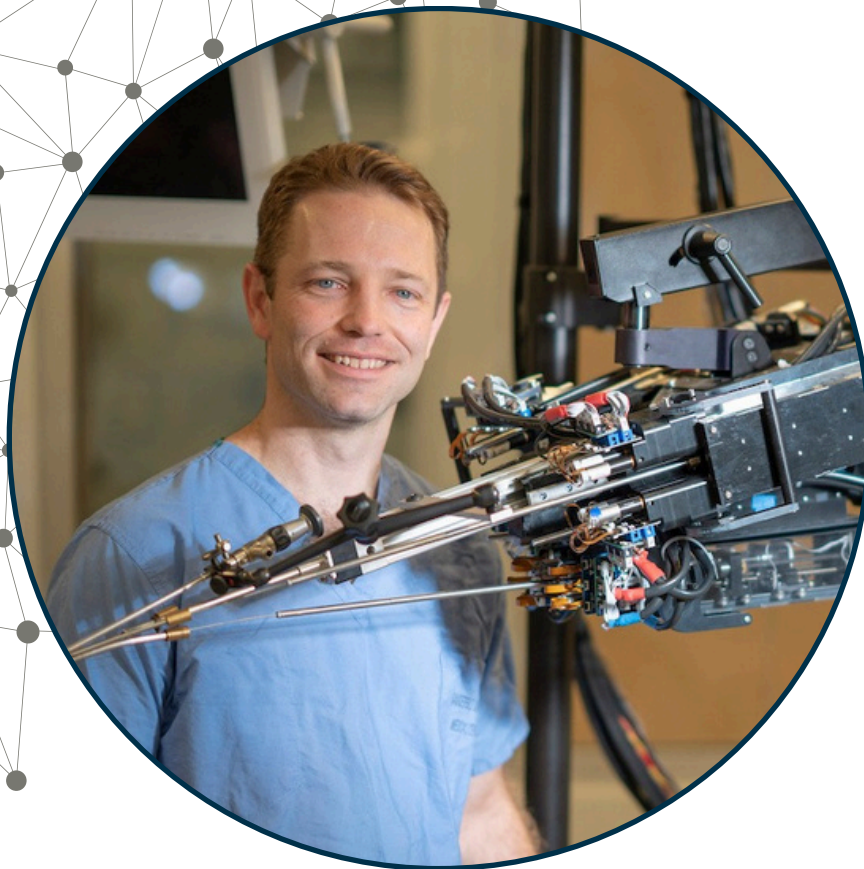
Medical Device PIPELINE

SURGICAL ROBOTICS
GI/ENDOSCOPY DEVICES
BIOMEDICAL PHOTONICS
NEUROSURGERY DEVICES
REHABILITATION TECHNOLOGIES
HEALTH CARE ACCESSORY DEVICES
BIOMEDICAL RESEARCH/DIAGNOSTIC DEVICES
SLEEP APNEA & ORGAN SUPPORT
CARDIOVASCULAR DEVICES
IMAGE-GUIDED SURGERY
SURGICAL TOOLS
CATHETERS

VANDERBILT.EDU/CTTC

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Who We Are

The Center for Technology Transfer and Commercialization provides professional technology commercialization services to the Vanderbilt community to optimize the flow of innovation to the marketplace and generate revenue that supports future research activities. CTTC accomplishes this by serving as an efficient and effective conduit for the transfer of promising Vanderbilt intellectual property to industry; contributing to regional economic development by licensing locally and supporting new venture creation; and encouraging collaboration between academia and industry.

Industry Collaboration

Key to carrying out the mission of CTTC is the ability to form collaborative and professional relationships with companies in a variety of industries including space exploration, education, pharmaceuticals, health care/patient care, robotics, energy, environmental preservation, engineering, and many more. CTTC does this through:

Strategic Negotiation

Timely transactions are as critical for us as they are for our industry partners. We pay careful attention to negotiation timelines and work to ensure high levels of responsiveness and rapid closing of negotiations.

Reasonable Diligence

Licenses must include reasonable diligence provisions to ensure that products based on Vanderbilt technology are developed and commercialized in a timely fashion for our benefit and the benefit of the public.

Societal Benefit

Our motivations for commercializations are deeply rooted in benefiting individuals and patients on a global scale.

Protection leads to Commercialization

CTTC views IP protection as a means to an end. The real focus is on commercialization of technologies.

Focused on Transactions

CTTC's experienced team of licensing professionals are highly transactionally focused.

Collaborative Research

CTTC highly encourages industry collaboration, either along with a license or as a precursor.

Quality Driven

High quality contracts lay the foundation for strong and lasting partnerships. Repeat business is important to us.



Core Research Capabilities

The Medical Device Pipeline highlights Vanderbilt's current collection of technologies that are the product of the university's commitment to collaborative, applied research in the fields of engineering and medicine. Vanderbilt has a number of centers, departments and institutes that are paving the way for engineers and clinicians to work together to find innovative solutions to the world's health problems.

Vanderbilt Institute for Surgery and Engineering (VISE)

VISE is an interdisciplinary, trans-institutional center focused on the creation, development, implementation, clinical evaluation and commercialization of methods, devices, algorithms, and systems designed to facilitate interventional processes and their outcome. Areas of focus include: image-guided surgery; intelligent, flexible robotic manipulation; ultrasound guidance for surgical interventions; steerable needles; wireless capsule robotics, etc.

Vanderbilt University Institute of Imaging Science (VUIIS)

VUIIS operates state-of-the-art facilities for imaging research at all scales including imaging animals and human subjects. Areas of focus include: cancer, neurological disorders, metabolic disorders, cardiovascular disease, and others.

Vanderbilt Institute for Integrative Biosystems Research and Education (VIIBRE)

VIIBRE invents the tools and develops the skills that are required to conduct research in systems biology. Areas of focus include: cellular biosensors, bioprocess controllers, mathematical models for wound healing and cancer, infectious disease detection, biomedical imaging, and cellular/tissue engineering.

Vanderbilt Institute of Nanoscale Science and Engineering (VINSE)

VINSE is focused on new science and technology based on nanoscale materials. Researchers team locally and globally, providing an environment where physicists, chemists, biologists, and engineers may collaboratively solve forefront problems and create new scientific understanding. Areas of focus include: nanobio, nanoscale electronics and optics, nanoscience theory, nanotechnology and new materials.

Department of Biomedical Informatics (DMBI)

Vanderbilt's DBMI is the largest academic department of biomedical informatics in the country, with more than 65 faculty members. Areas of focus include: computer science, information science, cognitive science, social science, engineering, and clinical and basic biological sciences.

Center for Rehabilitation Engineering and Assistive Technology (CREATE)

CREATE focuses on restoring health, mobility, independence and societal participation to individuals with disabilities by designing, developing and controlling next-generation assistive and rehabilitative technologies, such as prosthetic limbs and robotic exoskeletons. The center is led by Michael Goldfarb and Karl Zelik and consists of a state-of-the-art 3,000-square-foot motion analysis lab for human subject experiments, plus about 3,000 square feet of engineering and fabrication space.

Vanderbilt Biophotonics Center

The Biophotonics Center is a trans-institutional initiative that focuses on the development and application of photonic technologies for fundamental discovery and clinical translation in biomedicine. Areas of focus include: cancer photonics, neuro-photonics, and multiscale photonics.

Clinical Translational Science Award (CTSA)

The Clinical and Translational Science Award (CTSA) grant, the largest single government research grant in Vanderbilt's history, is aimed at expediting the translation of laboratory discoveries to patients in the community. The grant helps fund the Vanderbilt Institute for Clinical and Translational Research (VICTR), which provides access to resources, training and collaboration, and informatics and biostatistical systems to support translation of fundamental science discoveries into clinical practice.

Medical Products Support Services (MPSS)

Vanderbilt's Medical Products Support Services (MPSS), supports investigators who are involved with Food and Drug Administration (FDA) regulated device research. It provides a list of services including early device development guidance, regulatory guidance, investigation device exemptions support, and more,

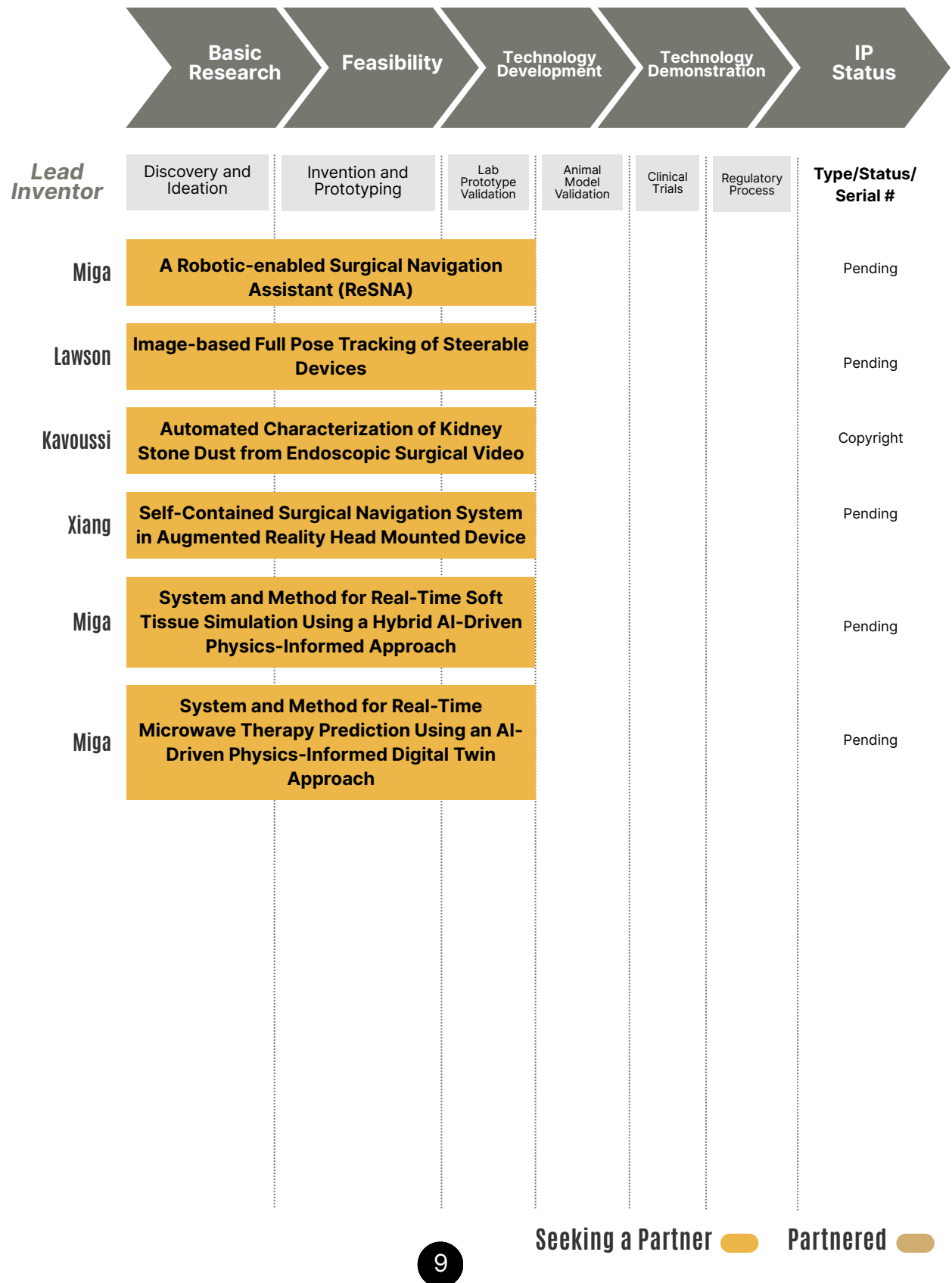
Vanderbilt University completed construction of a 230,000-square-foot Engineering and Science Building (pictured at right) that fosters project teamwork and offers programs, instrumentation areas and core research space that promote interdisciplinary work, particularly in engineering and related fields.



Image-Guided Surgery

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #			
Konrad/Dawant	Surgical Planning and Navigation Software for Deep Brain Stimulation (Portfolio)						Portfolio of Multiple Patents			
Labadie/Fitzpatrick	System and Methods of Using Image Guidance for Placement of Cochlear Stimulator Devices						Issued U.S. 8,380,288			
Galloway	Image Guided Navigation System for Endoscopic Eye Surgery						Issued U.S. 8,403,825			
Miga	Laser Range Scanning for Cortical Surface Registration and Deformation Tracking						Issued U.S. 7,103,399 7,647,087			
Miga	Brain Shift Compensation Using Computer Models						Issued U.S. 7,072,705			
Miga	Model-Based Compression Correction Framework for Ultrasound						Issued U.S. 9,782,152			
Miga	A Local Stylus and/or Image Transformation Device to Correct Data for Deformations in Image Guided Procedures						Portfolio of Multiple Patents			
Miga	Image Guided System for Breast Cancer Surgeries						Issued U.S. 10,426,556			
Miga	Therapeutic Guidance Compute Node Controller						Published U.S. 20200179051A1			
Miga	A Novel Trackerless Image Guided Soft Tissue Surgical Design for use with Surgical Microscopes or Similar Technologies						Issued U.S. 10,743,941			
Kavoussi	A Stone Tracking System for Endoscopic Kidney Stone Surgery						Published U.S. <u>US20240325089A1</u>			

Image-Guided Surgery (cont.)



Surgical Robotics

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status		
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #				
Simaan	Insertable Robotic Effector Platform Portfolio						Portfolio of Multiple Patents & Copyrights				
Webster/Barth	Precision Pneumatic Robot for MRI-Guided Neurosurgery						Issued U.S. 9,492,234 10,321,963				
Webster	Steerable Needles: A Better Turning Radius with Less Tissue Damage						Issued U.S. 10,548,628				
Simaan	Minimally Invasive Robotic Platform for Transurethral Exploration and Intervention						Issued U.S. 9,956,042				
Simaan	Low Cost Dexterous Wrists for Surgical Intervention						Issued U.S. 9,687,303 10,500,002				
Simaan	Methods for Quick and Safe Deep Access into Mammalian Anatomy						Issued U.S. 9,549,720				
Simaan	Algorithms for Compliant Insertion and Motion Control and Continuum Robots						Issued U.S. 9,539,726 10,300,599				
Simaan	Algorithms for Contact Detection and Contact Localization in Continuum Robots						Issued U.S. 9,333,650				
Valdastri	Wireless Tissue Palpation for Minimally Invasive Robotic Surgery Techniques						Issued U.S. 9,826,904				
Simaan	Algorithms and Methods for Motion and Force Control of Continuum Robots						Copyrights				
Webster	Flexible Instrument with Precurved Elements						Issued U.S. 10,73,398				
Webster	A Robotic System for Treating Intracranial Hemorrhage (ICH)						Issued U.S. 10,548,630				
Simaan	Continuum Robots for Micro-Scale Motion						Issued U.S. 10,967,504				

Surgical Robotics (cont.)

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #			
Webster	Hand-Held Concentric Tube Manipulator Actuation Unit and Mechanism for Surgery						Portfolio of Patents			
Webster	Modular, Sterilizable Robotic System for Endonasal Surgery						Issued U.S. 10,307,214			
Webster	Endoluminal Suturing with Concentric Tube Robots						Nationalized U.S. WO2021183501A1			
Webster	Snared-Tool Robotic Surgery System						Issued U.S. 10,912,620 Published EPO 3399938			
Webster	A System for Transoral Targeting of Suspicious Nodules in the Body						Issued U.S. 10,803,662			
Ferguson	Inertial Data Fusion for Cable Driven Robot Accuracy Improvement						Nationalized WO 2023/192681			
Ertop	Sensing the Shape of Elongated Elastic Bodies via Reflectometry						Nationalized WO 2024/129147			
d'Almeida	A Touchpad User Interface for Operating Actuated Devices						Nationalized WO 2024/129771			
Peters	A Compact, MRI-Compatible, Direct Drive Actuation Unit for Concentric Tube Deployment						Pending			
Ertop	Software Disclosure for the Shape Sensing via Reflectometry Technology						Copyright			

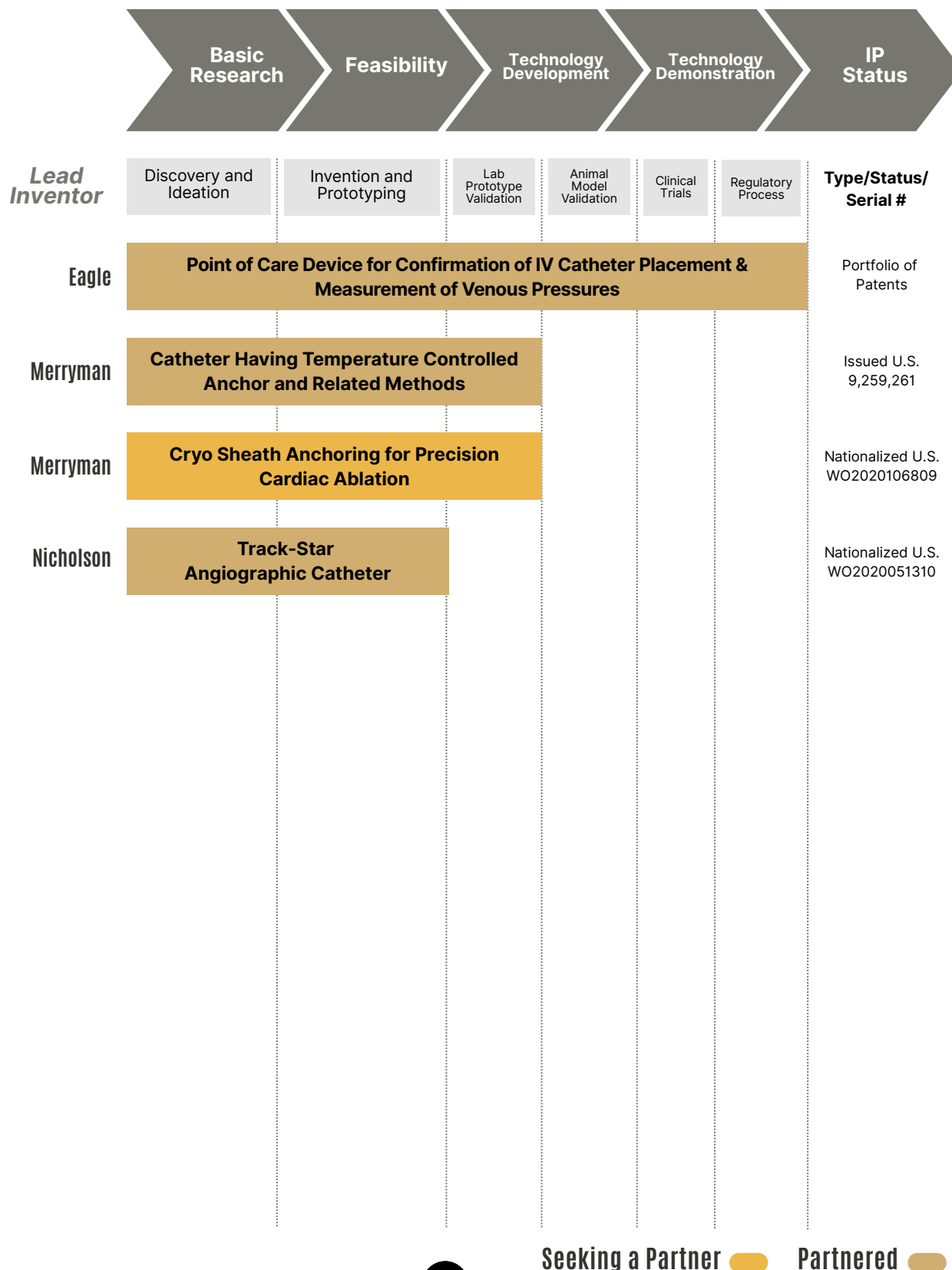
Non-Robotic Surgical Tools

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #			
Webster	MAESTRO: Non-Robotic Dexterous Laproscopic Instrument with a Wrist Providing Seven Degrees of Freedom (Portfolio)							Portfolio of Issued & Pending Patents		
Webster	Side-View Endcap with Curved Port for Nonlinear Endoscopic Interventions							Nationalized U.S. WO2022076387A1		
Langerman	Wearable Surgical Camera						Published U.S. 20190231472A1			
Geiger	SureTight: GI Anastomosis Leak Detection							Portfolio of Patents		
Higdon	Implant Placement Parachute							Nationalized U.S. WO2021247444A1		
Higdon	ON Ring Arterial Anastomotic Coupler Device							Nationalized U.S. WO2022010601A1		
Gupta	Mechanical Adjustable Ultrasound Probe Grasping Arm							Patent Pending		
Fissell	Viralysis: Coupled Hemofiltration and 11 Infections UV Sterilization for Severe Coronavirus Infections							Patent Pending		
Lin	Intraoral Vertical Ramus Osteotomy Surgical Guides							Published U.S. 20220233202A1		
Gabrick	Endoscopic Retinaculotome							<u>Published PCT WO2023028560 A1</u>		
Gafford	Steerable Medical Device Constructed from Concentric Tubes with Serpentine Beam Elements							Nationalized WO 2023/076667, published US-2024-0407772-A1		
Langerman	Customizable Inflatable Bolster							<u>Published PCT WO2024086844 A3</u>		

Non-Robotic Surgical Tools (cont.)

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #			
Higdon	Improved ON Ring and Applicator Device							Nationalized U.S. US20230240681 A1		
Stephens	Erector Spinae Regional Pain Indwelling Catheter Device							Published U.S. US20240382713A1		
Gardocki	Two Way Catheter for Percutaneously Treating Spine Infections and Abscesses							Pending		
Bacchetta	Dynamic Organ Storage							Published PCTWO202505953 9A1		
Gardocki	Percutaneous or Endoscopic abscess Debridement and Treatment Catheter							Pending		
Simaan	Materials and Methods for Accelerated Skill Acquisition and Assessment for Surgical Training							Pending		
Froehler	Aspiration Thrombectomy Syringe							Pending		
Wilke	Concentric Tube Instrument for Minimally Invasive Surgery							Pending		

Catheters



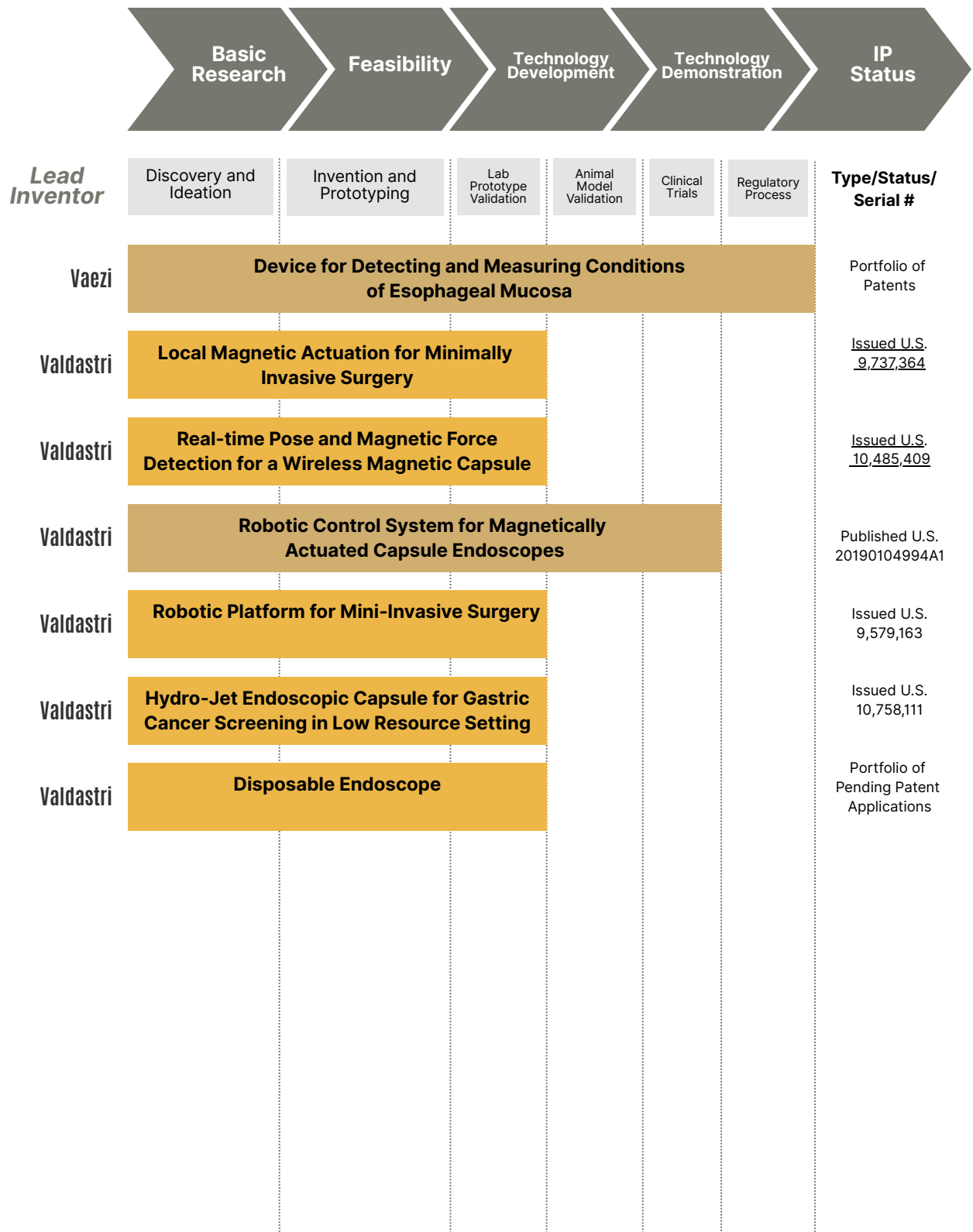
Prosthetic and Rehabilitation

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #			
Goldfarb	Vanderbilt Exoskeleton: Powered Lower-Limb Exoskeleton for Paraplegia						Portfolio of Multiple Patents			
Goldfarb	Powered Robotic Knee and Ankle Prosthesis for Transfemoral Amputees						Portfolio of Multiple Patents			
Goldfarb	Vanderbilt Multigrasp Myoelectric Prosthetic Hand						Portfolio of Issued Patents			
Sarkar	IntelliCane: Instrumented Cane for Diagnosis and Evaluation of Gait Behavior in Individuals with Mobility Issues						Issued U.S. 10,799,154			
Zelik	Wearable Exoskeleton for Reducing Low Back Loading						Portfolio of Pending Patents			
Goldfarb	Method for Detection of Intent						Nationalized U.S. WO2021167907A1			
Goldfarb	Prosthetic Knee Joint with Electronically Modulated Transmission						Nationalized U.S. WO2021173495A1			
Braun	Method and Apparatus for Facilitating Running						Published U.S. 20210186793A1			
Braun	Variable Stiffness Mechanisms for Low Energy Cost Stiffness Modulation						Published U.S. 20230036736A1			
Zelik	Wearable Device to Monitor Musculoskeletal Loading & Prevent Injuries						Nationalized U.S. EPO, AU, CA WO2019213012			
Goldfarb	Instrumented Clutch Devices, Systems, and Methods of Use						<u>Published U.S. 20230234215 A1</u>			
Goldfarb	ECT Passive and Powered Control						Published (US-2023-0270571-A1)			

Prosthetic and Rehabilitation (cont.)

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #			
Stehr	Intrinsic Glove						Pending			
Martin	Total Knee Tibial Implant Undersurface Design						Pending			
Zelik	Wearable Ankle Assist Device and Methods of Operation						Pending			
Sarkar	A Novel Method of Stabilizing Parkinson's Disease Related Tremors in a Wireless Multimedia Device Using Eye Tracking						Pending			
Sarkar	Design and Validation of a Wrist Exoskeleton for Weight Perception in Augmented Reality						Pending			
Guelcher	Lysine-Derived Poly(ether-thioketal-urethane) Dental Cements and Adhesives						Pending			
Guelcher	Thioketal Polythiol Crosslinkers						Pending			
Guelcher	Poly(thioketal thiourethane) Cements and Adhesives						Pending			
Stehr	Implantable Finger Prosthesis						Pending			
Macdonald	Nanoparticle Assisted Curing of Bone Cement						Pending			
Bhandari	Hinged Dorsal Spanning Plate						Pending			
Zelik	Wearable Sensor Algorithms and Systems for Remote Monitoring						Pending			

GI / Endoscopy Devices



Cardiovascular Devices

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation		Invention and Prototyping		Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #	
Eagle	Point of Care Device for Confirmation of IV Catheter Placement & Measurement of Venous Pressures								Portfolio of Patents	
Brophy	Autologous Vein Harvest Kit								Portfolio of Patents	
Byram	An Adaptive Clutter Demodulation Scheme for Measuring Low Velocity Blood using Ultrasound								Published U.S. 20170135675A1	
Merryman	Catheter Having Temperature Controlled Anchor & Related Methods								Issued U.S. 9,259,261	
Sung	Shape Memory External Stents for Vascular Applications								Portfolio of Pending Patents	
Eagle	Comparison of Peripheral and Central Intravenous Analysis to Echocardiography								Patent Pending	
Rohde	Intraoperative Vessel Sizer								Patent Pending	
Nicholson	Patent Ductus Stent								Nationalized U.S. WO2020210299	
DeFilippis	Solution for an Axillary Inserted IABP								Patent Pending	
Simaan	Smart Multi-Articulated Catheters for Image-guided Collaborative Intravascular Deployment								Published PCT WO2021055428	
Nicholson	Track-Star Angiographic Catheter								Nationalized U.S. WO2020051310	
Ukita	Smart Programmable Blood Pump for Controlling and Automating Extracorporeal Life Support Applications								Pending	

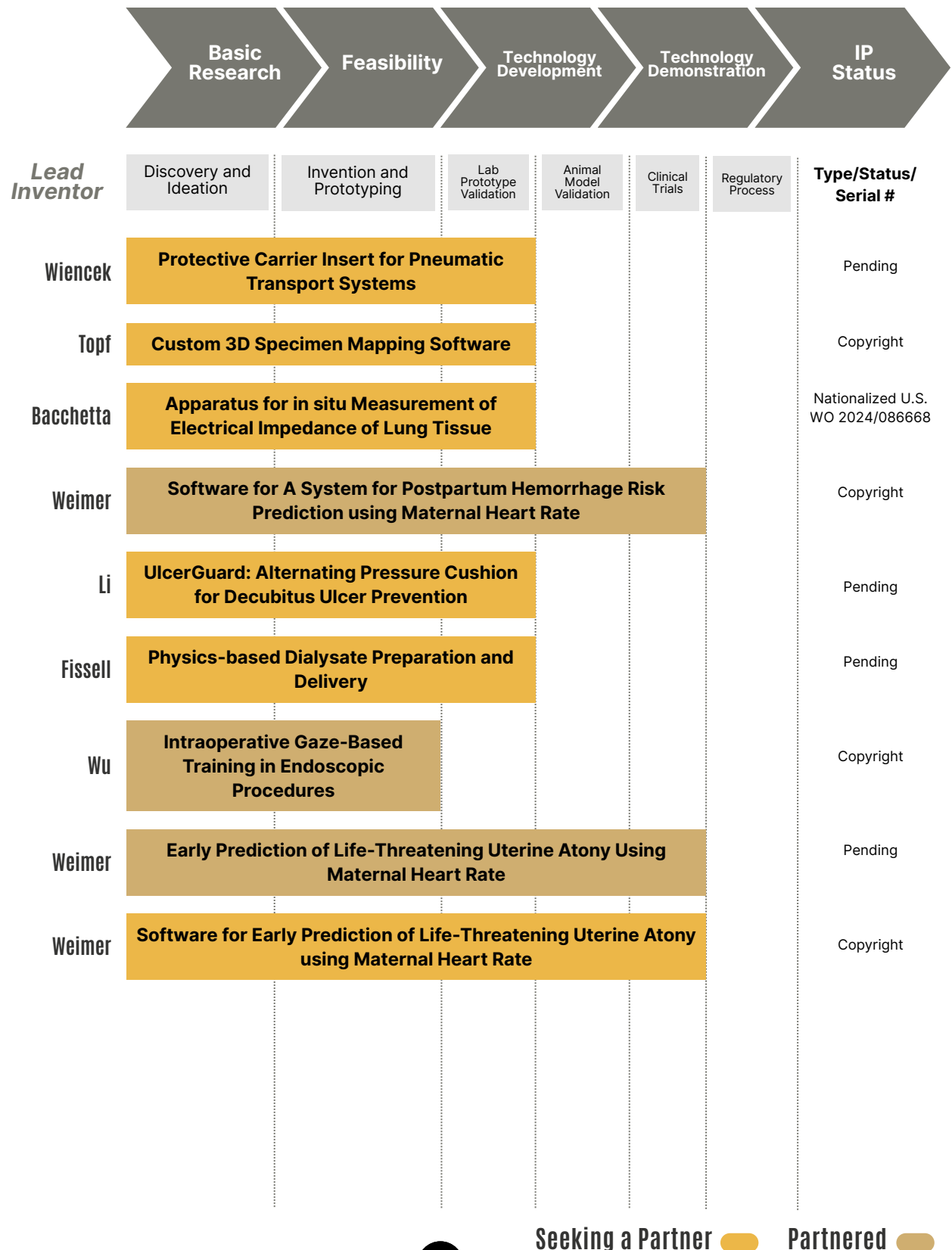
Neurosurgery Devices

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #			
Fitzpatrick	System and Methods for Determining Orientation of Bone Implanted Post for Cochlear and Deep Brain Stimulation						Portfolio of Patents			
Webster/Barth	Precision Pneumatic Robot for MRI-Guided Neurosurgery						Issued U.S. 9,492,234 10,321,953			
Labadie/Fitzpatrick	Systems and Methods of Using Image-guidance for placement of Cochlear Stimulator Devices and Drug Carrier Devices						Issued U.S. 8,380,288			
Webster	Electrical Impedance Method for Cochlear Implant Localization						Nationalized U.S. WO2020215000			
Thomas	Dense-Packed Probe Positioning Drive						Patent Pending			
Kao/Konrad/Fitzpatrick/Labadie	Adjustable Universal Platform for Surgical Navigation, Approach, and Implantation						Issued U.S. 8,414,597			
Charles	Modifying Early-Stage Parkinson's Disease Progression with Deep Brain Stimulation						Nationalized WO 2024/077043			
Johnson	Brain State Modeling for Adaptive Neuromodulation						Pending			
Crabtree	Instantaneous and fully reversible electrical nerve block targeting the auditory nerve						Pending			
Bowden	A Wearable and Scalable fNIRS, EEG/EIT, ECG, tPBM, and tDCS Platform for High Density Naturalistic Neuromodulation						Pending			

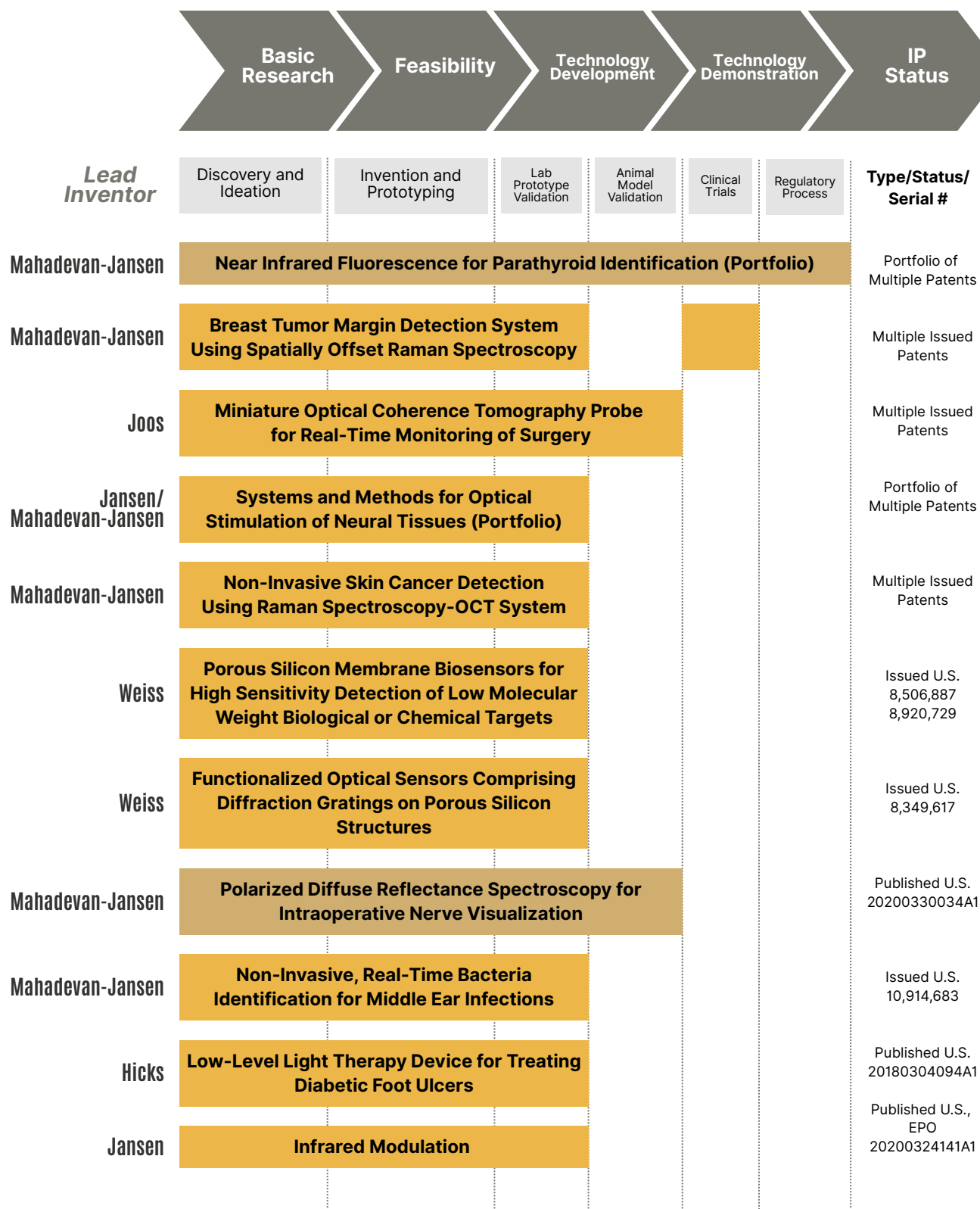
Health Care Accessory Devices

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status		
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #				
Bream	Maximum Barrier Sterile Drape for Neck and Upper Chest							Issued U.S. 8,826,912			
Baudenbacher	Automated Abdominal Binder for Treatment of Orthostatic Hypotension							Issued U.S. 10,179,083			
Schlesinger	DynoAlarm: Smart Patient Monitoring Alarm							Issued U.S. 9,870,678			
Byram	A Hand Held Device for Quantitative Assessment of Tissue Stiffness							Published U.S. 20160367220A1			
Grice	Portable Flow Phantom for Doppler Ultrasound Quality Measurements							Issued U.S. 10,085,725			
Makhoul	Pitting Edema Testing Device							Patent Pending			
Marasco	Metabolic Rate Sensor							Published U.S. 20200113516A1			
Nichols	Single-handed Side-loading Guidewire Torque Device for Interventional Medical Procedures							Issued U.S. 10,076,640			
Bacchetta	Non-Destructive Pressure-Assisted Tissue Stiffness Measurement Apparatus							U.S. nationalized WO 2023/056395			
Weimer	A System for Postpartum Hemorrhage Risk Prediction using Maternal Heart Rate							<u>Published PCT WO2024249906A2</u>			
Barnado	ANA Risk Model							Copyright			

Health Care Accessory Devices (cont.)



Biomedical Photonics



Biomedical Photonics (cont.)

		Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor		Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/Serial #			
Jansen		Systems and Methods for Fast and Reversible Nerve Block							Portfolio of Issued U.S. Patents		
Mahadevan-Jansen		Characterization of Salivary Biomarker Via Surface-Enhanced Raman Spectroscopy to Detect Eosinophilic Esophagitis							Patent Pending		
Mahadevan-Jansen		Image-Guided Probe-Based Dual Wavelength Raman Spectroscopy for Biological Applications							Patent Pending		
Mahadevan-Jansen		Dual Wavelength Combined Fingerprint and High Wavenumber Spatially Offset Raman Spectroscopy							Patent Pending		
Jansen		Selective Inhibition of Small-Diameter Axons Using Infrared Light							Published U.S., EPO 20210128913A1		
Jansen		Modulating Neural Activity in Brainstem Circuitry with Light							Published U.S., EPO US20200406057		
Mahadevan-Jansen		Infrared Neural Stimulation for Intraoperative Nerve Monitoring							Patent Pending		
Mahadevan-Jansen		Non-Contact Clinical Raman Spectroscopy Guided Probe							Nationalized U.S. WO 2023/249962		
Bowden		Functional Near-Infrared Spectroscopy (fNIRS) Systems and Methods							<u>Published U.S.</u> <u>20230337919 A1</u>		

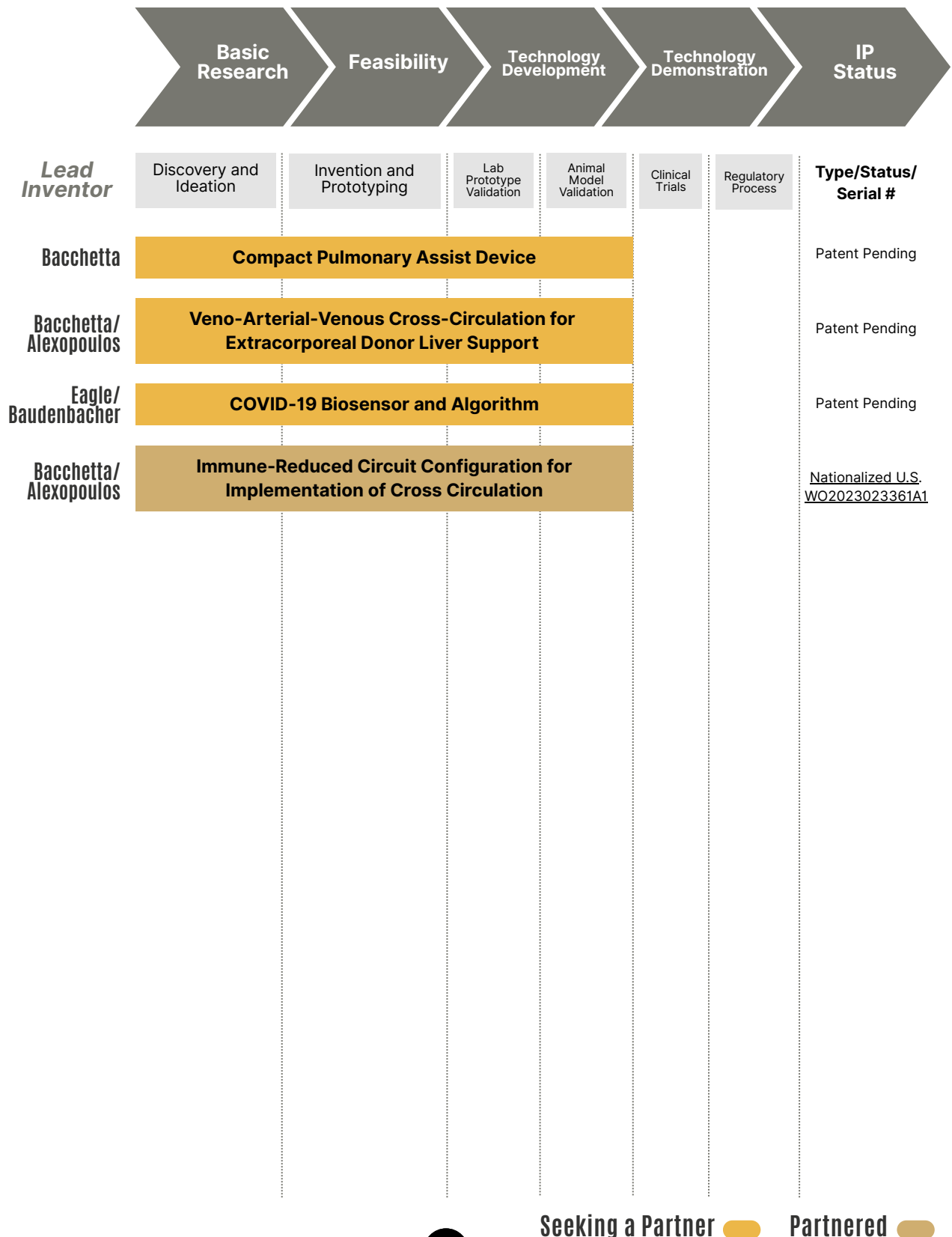
Biomedical Photonics (cont.)

		Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor		Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #			
Ndukaife		Optoelectrofluidic Device for Massive Parallel Trapping and Enhanced Spectroscopy of Single Nanoscale Objects						Published U.S. 20240075475 A1			
Mahadevan-Jansen		Optical Fibre Based Microprobe						Published PCT WO2019144195 A1			
Bowden		A Simple, Through-Hair Brush Attachment Design for fNIRS Probes to Improve SNR and Subject Inclusivity						Pending			
Tao		Systems and Methods for Augmented/Mixed Reality Display Using Digital Micromirror Device						Published U.S. US20250130413A1			
Tao		Systems and Methods for Quantification of Intraocular Dimensions and Volumes						Published U.S. US20250131644A1			
Tao		Shearing Interferometric Fluorescence Tomography (SIFT) for Depth- and Spectrally-Resolved Volumetric Imaging						Pending			

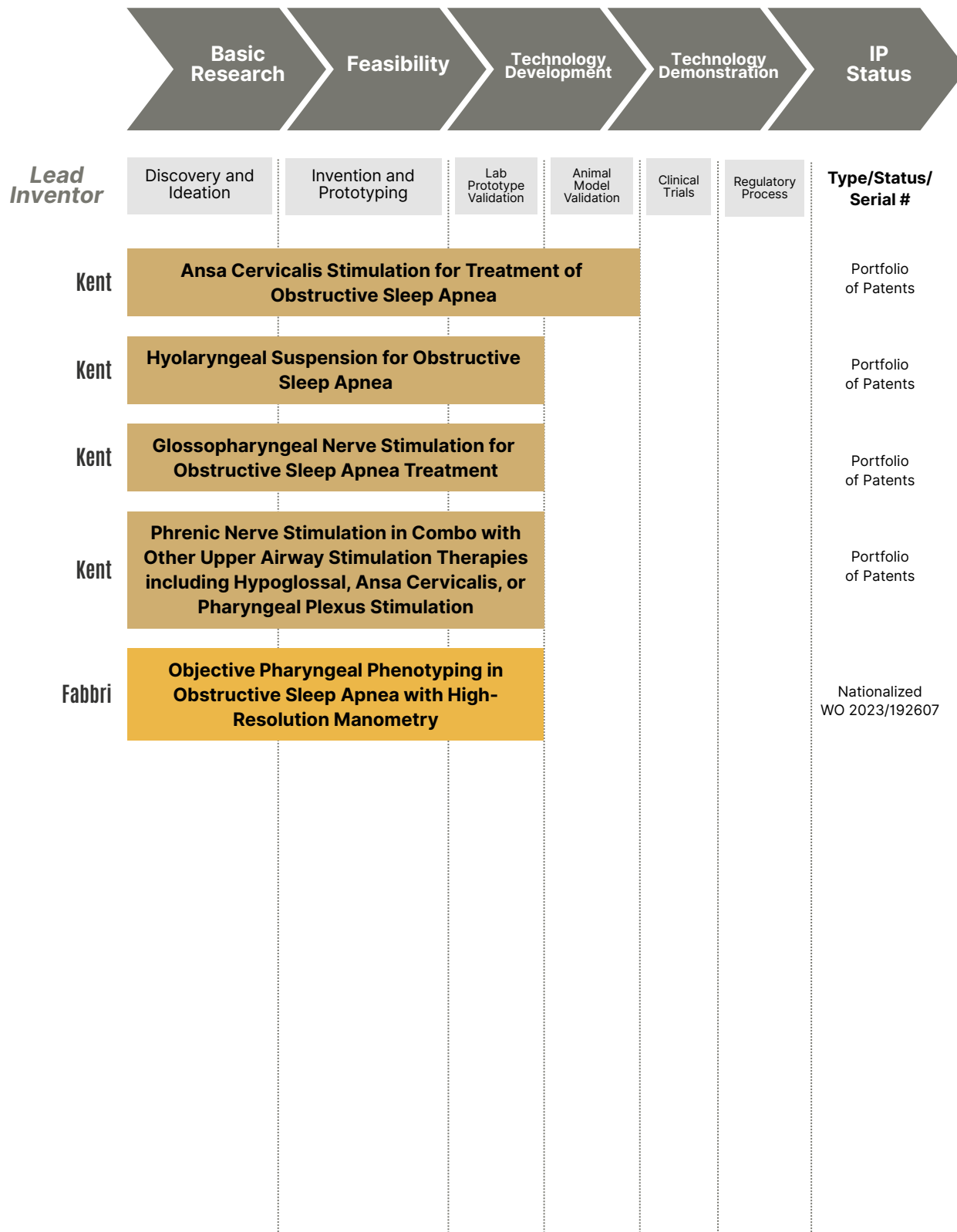
Biomedical Research / Diagnostic Devices

	Basic Research		Feasibility		Technology Development		Technology Demonstration		IP Status	
Lead Inventor	Discovery and Ideation	Invention and Prototyping	Lab Prototype Validation	Animal Model Validation	Clinical Trials	Regulatory Process	Type/Status/ Serial #			
Wiksw	Rotary Planar Peristaltic Micropump (RPPM) and Rotary Planar Valve (RPV) for Microfluidic Systems						Portfolio of Multiple Patents			
Baudenbacher	Thermal ELISA						Published U.S. 20150079583A1 Published PCT WO2015027151			
Eagle/ Baudenbacher	COVID-19 Biosensor and Algorithm						Patent Pending			
Eagle/ Baudenbacher	Orthopnea CHF Monitor						Patent Pending			
Weiss	Easy to Fabricate, Cost-Effective, and Stable Surface Enhanced Raman Scattering (SERS) Substrates						Issued U.S. 9,593,981			
Weiss	Porous Silicon Membrane Waveguide Biosensor						Issued U.S. 8,506,887 8,920,729			
Haselton	Extractionator: Low Resource Extraction and Processing of Biological Samples Using Surface Tension Valves						Issued U.S. 9,677,979 9,869,675			
Marasco	Wearable Metabolic Rate Sensor						Published U.S. 20200113516A1			
Manning	Device for Radiopharmaceutical Production						Published U.S. 20200316230A1			
Cyr	Point of Care Rheological Flow Assay for Diagnosis and Monitoring of Disease						Portfolio of Pending Patents			
Marasco	Point-of-care Test Imaging Software						Copyright			
Armstrong	Nasal Trans-Esophageal Echocardiography						Nationalized U.S. WO 2023/102195			
Valentine	Metasurface Enabled Barcoding for Flow Cytometry						Pending			

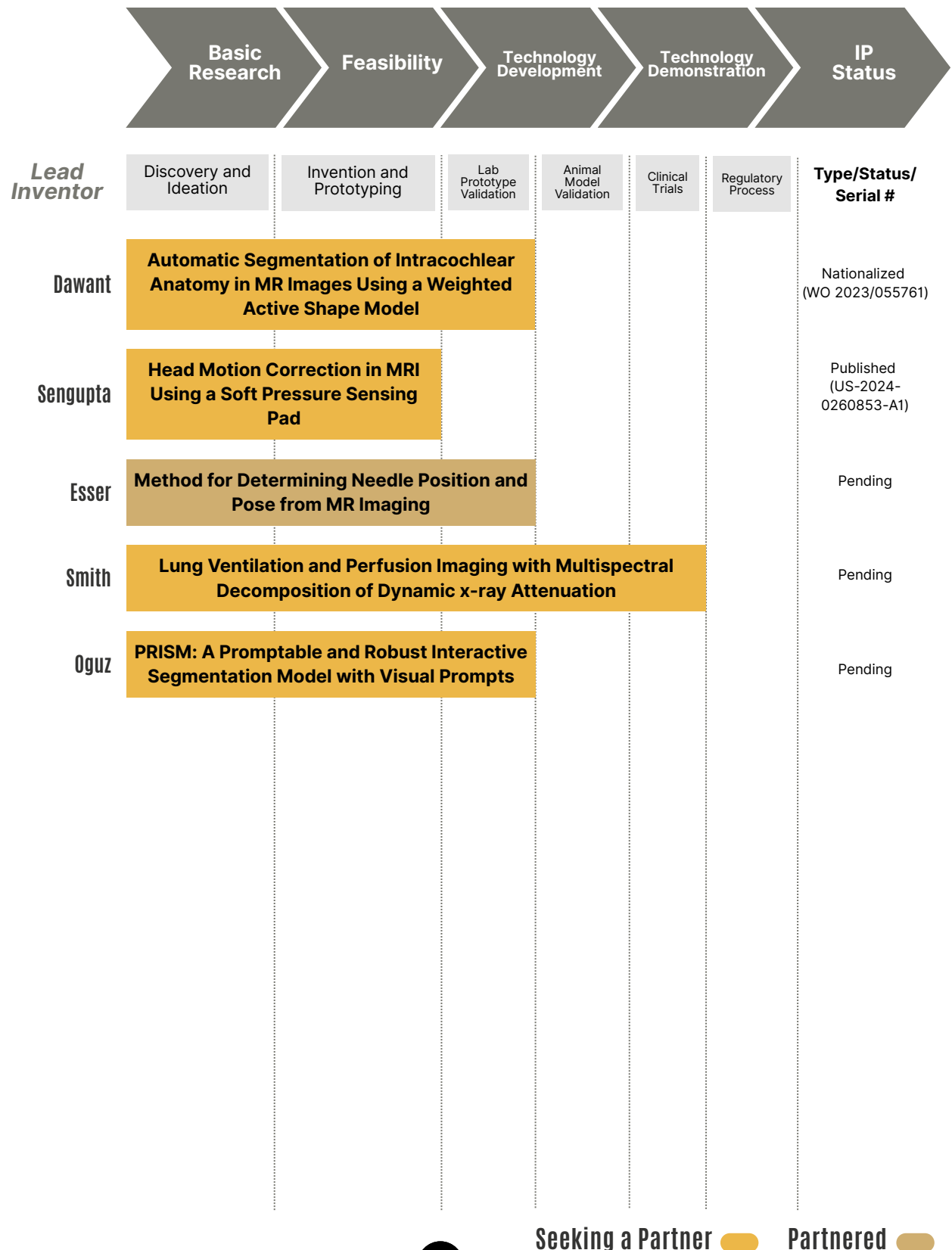
Life Support and Organ Transplant



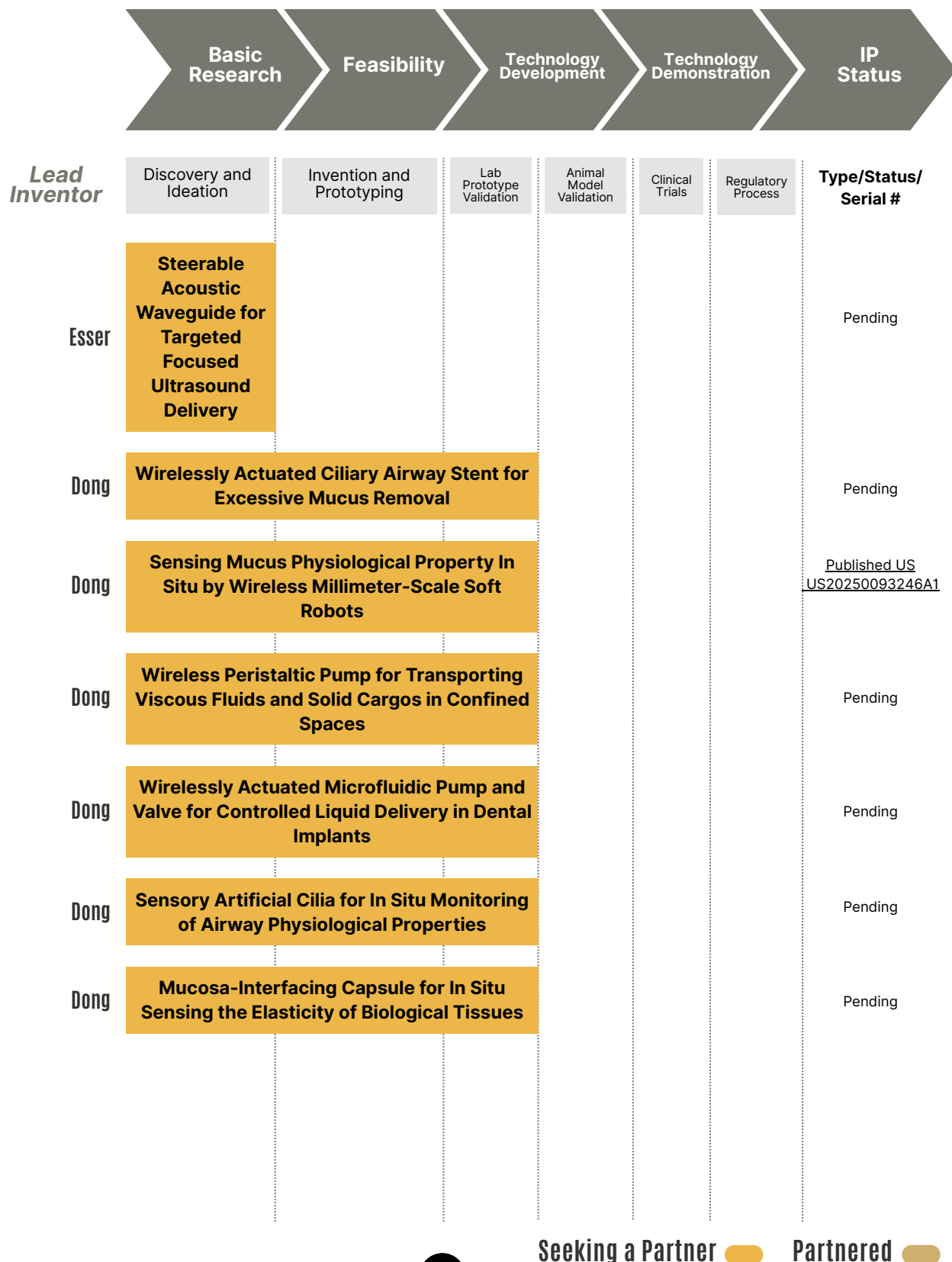
Sleep Apnea Treatment



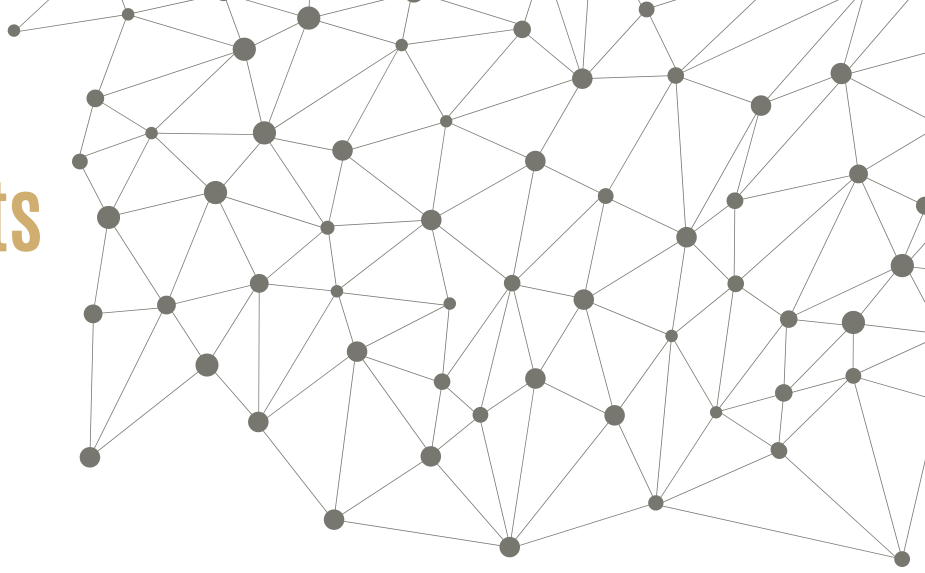
Medical Imaging



Minimally Invasive Medical Devices



Licensing Contacts



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Vanderbilt Research Quick Facts

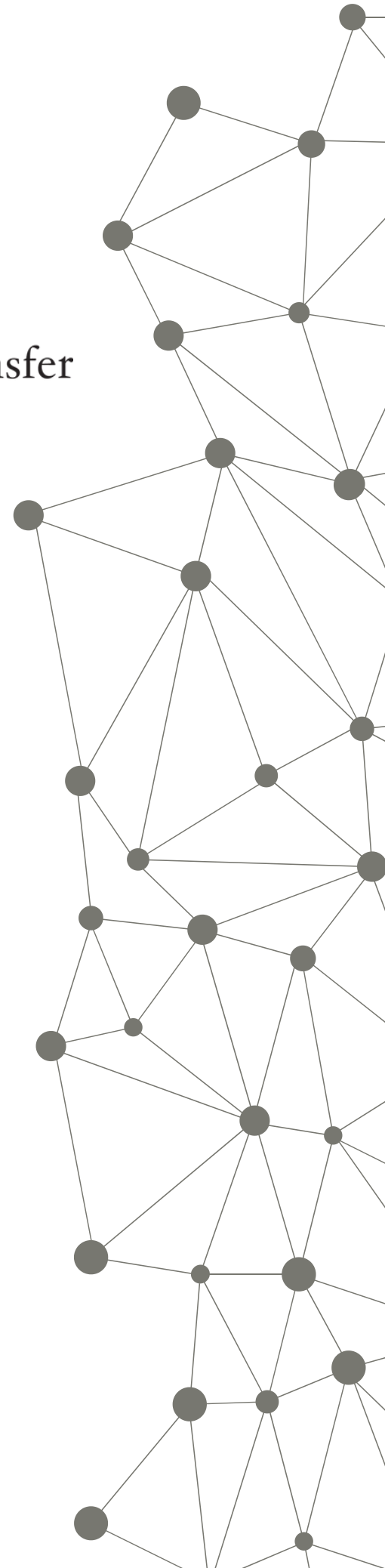
- ✓ Vanderbilt University, bolstered in part by its School of Engineering, is ranked among the top 25 private universities for research and innovation by the National Science Foundation.
- ✓ Vanderbilt is home to one of the oldest biomedical engineering departments in the country, dating back to 1968.
- ✓ The university's annual research and development expenditures exceed \$1 billion.
- ✓ Vanderbilt completed more than 1,500 patent applications, industry license agreements and material transfer agreements during fiscal year 2023.



The close proximity of the Vanderbilt School of Engineering and Vanderbilt University Medical Center enables a culture of interdisciplinary collaboration in research and education. The addition of the Engineering and Science Building in 2016 brings further opportunity for collaboration with seven floors of state-of-the-art research spaces and an innovation center called the Wond'ry.



VANDERBILT
Center for Technology Transfer
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Last edited: 2025

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