

Manufacturing Innovation Program	Allocation Amount	Project	Manufacturing Company	Location
Drexel University	\$ 54,827	"Supercritical CO2 Dyeing of UHMWPE Fibers" We propose and will demonstrate a new method of using sc-CO2 to dissolve and disperse dyes into the amorphous domains of as-spun UHMWPE fibers prior to drawing.	eCO2Dye, llc	Allentown, PA
The Pennsylvania State University - Harrisburg	\$ 70,000	"Taking Thermoforming to the Next Industrial Age - First Steps" Retrofitting the existing manufacturing system with customizable process monitoring and control framework to help Universal Protective Packaging Inc.	Universal Protective Packaging Inc.	Mechanicsburg, PA
University of Pittsburgh	\$ 67,991	"Femtosecond Laser Manufacturing of 3D Photonics Components in Nonlinear Optical Substrate" The proposed optics science research on laser interaction with bulk optic materials will drive ingenuity of photonic device engineering. If successful, it will have transformative impacts on the ultrafast laser manufacturing of 3D photonic devices.	II-VI Incorporated	Saxonburg, PA
University of Pittsburgh	\$ 70,000	"Improving 3D Binder Jet Printed Tungsten-Carbide Parts via Strategies to Increase Green Density Strength" This project will address challenges associated with achieving high density parts to meet the mechanical property and shape change requirements of General Carbide.	General Carbide	Greensburg, PA
The Pennsylvania State University - Harrisburg	\$ 70,000	"Concurrent Inclined Plate Settler Use in Industrial Stormwater Treatment" The project will field test the DBS-UUSI, a Pennsylvania-developed stormwater treatment device. This will enhance Hydro-Dynamics' marketing to industrial stormwater dischargers whose permits contain not-to-exceed discharge concentrations.	Hydro-Dynamic L.L.C.	Lancaster, PA
Lehigh University	\$ 69,875	"Pennsylvania Based Development of Smart and Adaptive Extrusion Manufacturing at Noortek LLC." The prototype systems to be developed, tested, and validated during the project will enable increased production throughput while minimizing capital expenses, die change-over time and other associated operational costs.	Noortek	Emmaus, PA
Temple University	\$ 51,840	"Local Autonomous Navigation for Materials Handling Ground Vehicles" The team at Temple University will prototype and develop the mapping and navigation modules and will work with ASI Drives to validate the system in a realistic, full-scale environment.	ASI Drives	Montgomeryville, PA
The Pennsylvania State University	\$ 62,278	"Enabling AFM Process Analysis for Advanced Technology Development" The proposed project will provide Extrude Hone with an Abrasive Flow Machining simulation framework.	Extrude Hone, LLC	Irwin, PA
Temple University	\$ 69,977	"INVEST: Intelligent, Networkable, and Versatile Energy Storage Technology" Temple University, in collaboration with EnerSys, the global leader in stored energy solutions and industrial battery manufacturing, proposes to develop next-generation energy storage technologies.	EnerSys	Reading, PA
Widener University	\$ 50,545	"Multi-scale Characterization of Additive Manufacturing Polymers: Simulation and Experimental Study" This project focuses on diagnosing the causes and precursors to 3D printed part failures.	Fenner Drives	Manheim, PA
The Pennsylvania State University -The Behrend College, Erie	\$ 57,827	"Impact of Active Pharmaceutical Ingredient (API) Spatial Orientation and Matrix Phase Behavior on Drug Release from Extruded and Injection Molded Long-Acting Implants" This proposal unites the pharmaceutical expertise of Merck of West Point, PA and the Plastics Engineering Technology program of Penn State Behrend in Erie, PA to develop an understanding of the interplay between manufacturing conditions and long-term drug release.	Merck	West Point, PA
University of Pennsylvania (in collaboration with The Pennsylvania State University)	\$ 67,106	"Design and Manufacturing of Patient-Specific Rib Implants" The goal of this collaboration between two research universities and DePuy Synthes is to develop and validate additive manufacturing protocols that allow for precision medicine approaches to the manufacturing of orthopedic implants.	Johnson & Johnson	West Chester, PA
Villanova University	\$ 42,484	"Smart Brain Imager" This collaborative project aims to design, develop and manufacture a universal, comfortable, durable, affordable and reliable platform, based upon fNIRS technology, that is miniaturized, fully wireless and app-operable which can accelerate cognitive health monitoring.	Infrascan	Philadelphia, PA

Lehigh University	\$ 70,000	"Fabrication of High Strength and Biocompatible/Bioabsorbable Surgical Skin Adhesives for Wound Closure" We propose to develop an optimal hydrogel-based surgical skin adhesive that is tough, stretchable, shape conformable, and highly adhesive, while being biocompatible and bioabsorbable.	Adhezion Biomedical	Wyomissing, PA
Robert Morris University	\$ 39,904	"Implementation of User Feedback to Improve 3D printed Orthotics and Prosthetics Design and Manufacturing Process" Robert Morris University and Union Orthotics will conduct clinical tests of 3D printed prosthetic socket with selected patients for feedback. The feedback will be implemented into the design process and will be a critical step to fill the gap between technology and user needs.	Union Orthotics & Prosthetics Co.	Pittsburgh, PA
Thomas Jefferson University	\$ 69,212	"Hemp Reinforced Bio-Plastic for 3D Printing" Thomas Jefferson University will work with Coexist to develop a line of hemp-reinforced polymer 3D printing filaments that are biodegradable, sustainable, and have superior mechanical and physical properties.	Coexist, LLC	Blandon, PA
Thomas Jefferson University	\$ 69,212	"Hemp-Derived Composites for Molded Acoustic Tile Applications" Thomas Jefferson University will work with Eastern Hemp Company to develop a line of hemp reinforced polymer composite injection molding pellets.	Eastern Hemp Company, LLC	Chester, PA
Drexel University	\$ 70,000	"A Digital Thread Design Approach for Product Smart Manufacturing" Oat Foundry has provided Drexel University's Theoretical and Applied Mechanics Group with a unique opportunity to innovate their gearing mechanism by not only improving its overall design and performance characteristics, but by also developing an optimized manufacturing scalability plan for mass production which can be replicated in other products and manufacturing methods.	Oat Foundry LLC	Philadelphia, PA
Lehigh University	\$ 69,881	"Development of Refractories for Renewable Energy Applications" The successful completion of this project will lead to the development of new refractory castable formations specifically designed for solar thermal applications.	Dynalene (Whitehall, PA) and HWI Harbison Walker International (Moon Township, PA)	Whitehall, PA and Moon Township, PA
University of Pittsburgh	\$ 70,000	"Smart Crucible: Monitoring Damage of Crucibles by Embedded Electric Resistance Sensor" Through close collaboration between Vesuvius and University of Pittsburgh, this research will develop a smart crucible which monitors in-situ the damage evolution during a smelting process and prevents the complete fracture and the leak of melts.	Vesuvius	Pittsburgh, PA
Villanova University	\$ 69,993	"Wetting of Binder Solution on Porous Bed of Microparticles" We propose to visualize the microscale binder-particle interaction and generate guidelines for material and parameter selection of the binder jet 3D printing.	The ExOne Company	North Huntingdon, PA
Drexel University	\$ 70,000	"Rapid Adhesion of Aerospace and Commodity Polymer Substrates Through Alkylborane-Initiation" This proposal will result in the development of a new adhesion system that will enable new, rapid manufacturing processes, capable of being implemented within hours under atmospheric conditions and low temperatures.	The Boeing Company	Ridley Park, PA
The Pennsylvania State University	\$ 70,000	"Advanced Manufacturing of Ceramics for PA Industries" The goal of this project is to position PA ceramics industries as global and national leaders in the manufacturing of advanced nuclear materials by developing a new class of ceramic materials using binder jetting technology which will provide a unique combination of high-temperature stability, corrosion resistance, and toughness necessary for a wide range of applications.	The ExOne Company	North Huntingdon, PA
The Pennsylvania State University - Harrisburg	\$ 70,000	"Evaluation of Recycled Foamed Glass Aggregates in Lightweight Precast Concrete" Testing from this project is expected to lead to the approval of Aero Aggregates as a material suitable for lightweight concrete.	Aero Aggregates of North America LLC	Eddystone, PA
Gannon University	\$ 58,938	"Compression Stress Relaxation (CSR) to Assess Seal Performance" Gannon University will partner with Corry Rubber Corporation to perform CSR tests on elastomeric seals, made from different materials and with different dimensions.	Corry Rubber Corporation	Corry, PA
Drexel University	\$ 66,944	"Damage-tolerant Design of Ultra-High-Performance Cementitious Composite" Inspired by the complex hierarchical architectures present in many biological structures, Drexel University and TAKTL have teamed up to investigate the fracture behavior of Ultra-High-Performance Cementitious (UHPC) composites to design damage-tolerant structural materials.	TAKTL	Turtle Creek, PA

Carnegie Mellon University	\$ 69,457	"Biomanufacturing of Dissolvable Microneedle Arrays for Transdermal and Intradermal Delivery of Biopharmaceuticals" The project will produce critical results that will demonstrate the applicability of dissolving microneedle array manufacturing technology to biopharmaceuticals, and identify favorable process and materials for manufacturing of MNAs for biologic delivery.	SkinJect, Inc.	Pittsburgh, PA
Lehigh University	\$ 69,909	"Manufacture of Membrane Modules for Cleaning PA Fracking Flow-back Water Using Membrane Distillation Process" The proposed work will manufacture Membrane Modules that will be used for solar-assisted MD to clean Fracking wastewater.	Solarflux Energy Technologies, Inc.	Bethlehem, PA
Gannon University	\$ 70,000	"Comparison between Polymeric and Optimized Composite Materials for Mold Making" This project will provide a process that uses additive manufacturing as the base to create molds made of composite materials that can have properties comparable to traditional metal molds, but can be produced inexpensively and with very low turnaround time.	MP-Erie-Co.	Erie, PA
The Pennsylvania State University - Dubois	\$ 69,103	"Cold Sintering Aided Manufacture of High Green Strength and Dense Powdered Metal Components" By the end of the project, the key advantages and processes in the manufacture of electromagnetic PM components will be well established in terms of performance, energy saving and cost-effectiveness.	Horizon Technology	St. Marys, PA
Temple University	\$ 69,939	"Development of Metalworking Fluid for Compacted Graphite Iron (CGI) Machining Using Advanced Tools" This work will lead to a deep understanding of the effect of lubricant composition and machining parameters of the PCBN tool degradation, which can in turn assist the development of novel lubricants for high-speed machining of CGI.	Quaker Houghton	Conshohocken, PA
Carnegie Mellon University	\$ 69,992	"Binder Jet 3D Printing from Powder Produced by Metal Attrition" This project will result in the optimization of processing parameters and densification in binder jetting process, specifically with irregularly shaped powders such as the metal attrition powder.	The ExOne Company	Irwin, PA
The Pennsylvania State University	\$ 70,000	"Human Error Reduction in Mack Truck Operations" The research team seeks to better understand errors currently attributed to lack of attention and forgetfulness. Equipped with an event map associating errors informed by SRK levels to the HTA, Mack Trucks will have more insight into where errors are occurring in the work process and begin to address error mitigation.	Mack Trucks, Inc.	Macungie, PA
Carnegie Mellon University	\$ 70,000	"Additive Manufacturing of Pulsating Heat Pipes for Compact and Efficient Thermal Management" This project aims to leverage the state-of-the-art additive manufacturing techniques to develop a prototype of 3D printed PHPs for compact, efficient and reliable thermal management of electronics (and potentially for space applications).	Advanced Cooling Technologies, Inc.	Lancaster, PA
University of Pittsburgh	\$ 69,450	"A Computational Tool for Simulating the Sintering Behavior in Binder Jet Additive Manufacturing" This project aims to develop a computational tool for simulating the deformation and porosity resulting from the sintering of BJP parts made of 316L stainless steel powders.	The ExOne Company and ANSYS	Irwin and Canonsburg, PA
The Pennsylvania State University	\$ 70,000	"Multiple Core Assembly Production Improvement and Enhancement" The goal of this project is to increase casting productivity.	Benton Foundry, Inc.	Benton, PA
Carnegie Mellon University	\$ 70,000	"Manufacturing Heat Exchanges via Additive Processes" The research will result in identification of laser powder bed fusion process parameters that result in repeatable, high-quality, and high-productivity of a heat exchanger component. Production of this component will enable Wabtec to address a major customer issue through the use of AM technologies.	Westinghouse Air Brake Technologies Corporation (Wabtec)	Pittsburgh, PA
Carnegie Mellon University	\$ 70,000	"Optimal Parts Consolidation and Structural Redesign for Additive Manufacturing to Reduce Weight, Production Costs, and Lifecycle Fuel Use" The proposed project is motivated by a long-term vision of creating a software tool where a user can upload a CAD file of a large-scale system and it will automatically identify components and subsystems to produce a consolidated monolithic parts, and optimally redesign them for AM to minimize production costs and meet structural loading requirements.	Ansys, Kennametal, and ExOne	Canonsburg, Latrobe, and Pittsburgh

Villanova University	\$ 38,707	"Manufacturing Process, Assembly and System Yield Optimization for Microelectromechanical Systems Devices" To give Avo Photonics the competitive advantage, Villanova Graduate Manufacturing Fellows conduct research and analysis to improve manufacturing yields.	Avo Photonics, Inc.	Horsham, PA
University of Pennsylvania	\$ 69,998	"Fabrication of High Strength and Biocompatible/Bioabsorbable Surgical Skin Adhesives for Wound Closure" We will work with Adhezion to narrow down the materials selection toward in vitro and in vivo studies of adhesion strength, cytotoxicity, antimicrobial properties, and compatibility with existing wound closure sutures.	Adhezion Biomedical	Wyomissing, PA
The Pennsylvania State University	\$ 70,000	"Image-guided Quality Control for Low-volume and High-mix Manufacturing" This project addresses the complex structures in the high-dimensional image streams for in-situ monitoring and control of manufacturing processes, which enables real-time quality inspection, defect mitigation, and process improvement.	Argolytics, LLC	State College, PA
Drexel University	69,958	"Scaling in Pharmaceutical Tablet Processing" A collaborative study between Drexel University and Natoli Scientific aims to understand the issues related to scaling of pharmaceutical tableting and properties across different tablet sizes.	Natoli Scientific	Telford, PA
University of Pittsburgh	\$ 70,000	"Pushing the Boundaries of Ceramic Additive Manufacturing (CAM) with Visible Light Initiated Polymerization (ViP)" Upon completion of the project, we will obtain new knowledge and evaluate the capability of ViP-CAM to advance manufacturing of quality ceramic parts.	Kennametal, Inc.	Latrobe, PA
	\$ 2,825,347			