



National Institute of Standards and  
Technology  
Department of Commerce

# **SBIR**

**SMALL BUSINESS INNOVATION  
RESEARCH PROGRAM**

**ARP Fast-Track, PHASE I and PHASE II  
AWARDS FOR FISCAL YEAR 2022**

## **INTRODUCTION**

### Abstracts of Awards for Fiscal Year 2022 SBIR Program

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## Fiscal Year 2022 List of Awardees

<u>Award Number</u>	<u>Company Name</u>	<u>Phase</u>
70NANB22H118	3D Array Technology LLC	ARP Fast-Track
70NANB22H122	IC3D Inc.	ARP Fast-Track
70NANB22H121	Ratiocinative Engineering Services LLC	ARP Fast-Track
70NANB22H119	Vuronyx Technologies	ARP Fast-Track
70NANB22H192	AAPlasma LLC	Phase I
70NANB22H191	Advent Diamond Inc.	Phase I
70NANB22H194	Criticality Sciences Inc.	Phase I
70NANB22H189	InfraTrac Inc.	Phase I
70NANB22H185	Julia Jean LLC	Phase I
70NANB22H186	Qualterra Inc formerly NuPhy Inc.	Phase I
70NANB22H182	Refined Imaging LLC	Phase I
70NANB22H187	Solution Spray Technologies LLC	Phase I
70NANB22H190	SPEC Sensors LLC	Phase I
70NANB22H195	Stratio Inc.	Phase I
70NANB22H196	Tiami LLC	Phase I
70NANB22H188	USEncryption	Phase I
70NANB22H136	ChemCubed LLC	Phase II
70NANB22H128	Colloidal Metrics Corp.	Phase II
70NANB22H132	Exum Instruments Inc.	Phase II
70NANB22H129	Irradiant Technologies Inc.	Phase II
70NANB22H135	Multiscale Systems	Phase II
70NANB22H131	Xallent LLC	Phase II
70NANB22H133	Zyмосense Inc.	Phase II

## FY 2022 ARP FAST-TRACK AWARD

**3D Array Technology LLC** (Storrs, Connecticut) \$800,000

*Nanostructure Array Integrated Medical Mask Design with High Filtration, Low Breathing Resistance, and Antimicrobial Performances* — a new type of nanostructure array (nanarray) of integrated microfibers to enable medical masks with high filtration efficiency, low breathing resistance and good antimicrobial capabilities.

**IC3D Inc.** (Columbus, Ohio) \$800,000

*Regionalized Quality Control Centers for Mobilization of Distributed Additive Manufacturing* — a pilot regional additive manufacturing quality control center to address access to appropriate quality control testing facilities for the manufacturing of critical supplies in a pandemic.

**Ratiocinative Engineering Services LLC** (Boulder, Colorado) \$771,619

*Multispectral Fluorescence Sensing of Airborne Proxy Infectious Particles in Actual Indoor Environments* — a testbed that will lead to more accessible and robust quality control testing of air filtration and ventilation systems in actual built-up environments.

**Vuronyx Technologies** (Woburn, Massachusetts) \$799,970

*Peracetic Acid Based Disinfectant for PPEs* — a powder for disinfection of personal protective equipment (PPE), so that the PPE could be reused.

## FY 2022 PHASE I AWARD

**AAPlasma LLC** (Philadelphia, Pennsylvania) \$99,936

*Direct Deposition of Durable Composite Road Marking Material onto Pavement Via Quasi-Equilibrium Plasma* — a technology to address the needs of our nation's physical infrastructure and resilience by reducing costs and improving the reliability of road markings.

**Advent Diamond Inc.** (Scottsdale, Arizona) \$100,000

*Phosphorous-doped Quantum Diamond for Electrical-readout Quantum Measurements* — a new quantum material consisting of a layer of phosphorus-doped diamond materials for quantum technologies including nitrogen-vacancy center-based sensors. Near-term applications include measuring magnetic fields for research, space-based applications and defense.

**Criticality Sciences Inc.** (Alexandria, Virginia) \$100,000

*Network Resilience to Cascading Failure* — a software tool that will provide scalable and affordable resilience metrics, as well as mitigation and recovery guidance, to help utilities and communities build resilience against cascading infrastructure failures.

**InfraTrac Inc.** (Silver Spring, Maryland) \$100,000

*Analytical Quality Management for 3D-Printed Small Molecule Drugs* — a nondestructive testing technique that uses near-infrared spectroscopy to assess the quality of in-pharmacy 3D drug printing, to support customized pharmacy formulations

**Julia Jean LLC** (Irvine, California) \$100,000

*Streamlining Lithography for Scalable Electron Emission from Microfabricated Porous Silicon Carbide: Advancing a NIST-Patented Technology* — to carry forward NIST-patented technology for an electron field emitter that does not rely on a traditionally required heating element and that could be applied to advanced technologies such as lithography, electron microscopy, X-rays, radar and microwave communications.

**NuPhy Inc.** (Pullman, Washington) \$100,000

*TreeTracker: An Intelligent Plant Production Optimization* — a cloud-capable software platform that provides insights into how best to optimize plant growth, maximize production output, and minimize costs for the process of creating new plants.

**Refined Imaging LLC** (Baton Rouge, Louisiana) \$100,000

*Cyber-Physical Trust Anchors with Definable Costs and Security* — a technique that will help protect against counterfeit manufactured components by connecting a physical part with a secure database protected by blockchain technology.

**Solution Spray Technologies LLC** (Storrs, Connecticut) \$100,000

*Real-Time Thickness Measurement Technology for Process Control of Plasma-Spray Based Coating Manufacturing* — a system that can measure the thickness of coatings on small objects with complex geometries by using lasers to generate ultrasound waves on the coatings.

**SPEC Sensors LLC** (Newark, California) \$99,956

*Materials for Gravure Printing of Chemical Gas Sensors* — a new process to manufacture high volumes of miniaturized chemical gas sensors that could potentially be embedded in wearable products for a variety of safety applications.

**Stratio Inc.** (San Francisco, California) \$98,381

*Low-cost Portable Short Wavelength Infrared Spectrometer (SWIR)* — a feasibility study to advance research in SWIR technology that will help the technology to expand into emerging markets such as precision agriculture, night vision, smart mirrors and robotic surgery.

**Tiami LLC** (Elk Grove, California) \$98,681

*Digital TV-based Positioning for First Responder Tracking in GPS-Denied Environments* — a technology that will enable real-time tracking of first responders in environments where GPS is not an option.

**USEncryption** (Orlando, Florida) \$100,000

*Establishing the Security of Ciphers Designed Using Statistical Physics Principles to Enable Direct Computation on Encrypted Data* — an approach to enable computation on encrypted data using a new version of an encryption method known as a block cipher as well as a patent-pending method to encrypt both the data and the mathematical functions that operate on encrypted data.

## **FY 2022 PHASE II AWARD**

**ChemCubed LLC** (Stony Brook, New York) \$399,999

*Nanocomposite Dielectric Material and Printing Process for Energy Efficient Manufacturing of Printed Circuitry* — a project to evaluate the printing and mixing parameters of a new nanocomposite material to find its optimal mechanical properties, and to scope its electrical properties to facilitate new use cases and improved manufacturing.

**Colloidal Metrics Corp.** (Mountain View, California) \$400,000

*Innovative Emulsion Polymerization Manufacture of Dual-function, Nanoscale, Calibration Spheres Over the Range of 100 to 400 nm Diameter* — a project to extend its ability to manufacture 100 nanometer (nm) polystyrene latex size standards to include 200 and 400 nm latexes and add accurate particle concentration data to all the size standards.

**Exum Instruments Inc.** (Lakewood, Colorado) \$399,839

*An Innovative Mass Spectrometer to Simplify Materials Characterization for Additive Materials* — a single analytical instrument that offers rapid, high-sensitivity measurements of additive manufacturing (AM) feedstock powders and printed parts.

**Irradiant Technologies Inc.** (Cambridge, Massachusetts) \$399,943

*High Throughput Experimental Discovery and Optimization for 3D Nanofabrication of Optical*

*& Photonic Materials and Devices* — an experimental discovery system capable of screening for and implementing new materials for the 3D manufacture of novel optical and photonic devices.

**Multiscale Systems** (Worcester, Massachusetts) \$400,000

*Contract-free Optical Metrology for Energy-efficient Manufacturing of Mechanical Metamaterials* — the design and production of mechanical metamaterials for lightweight high-strength sandwich panels that outperform comparable foam and honeycomb materials for semi-trailer vehicle lightweighting.

**Xallent LLC** (Ithaca, New York) \$400,000

*Nano-Electro-Mechanical-Systems Probe for Thin Film Materials Characterization* — a hybrid metrology system that allows for fast, cost-effective and nondestructive characterization of thin film materials and semiconductor devices.

**Zymosense Inc.** (Ames, Iowa) \$400,000

*Automated Aqueous Two-phase Separation of Single Walled Carbon Nanotube Species for Enrichment Process Optimization and Scale Up* — prototype purified single-walled carbon nanotubes (SWCNT) that could greatly expand SWCNT use and practicality for applications including the separation of components in mixtures.