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March 1, 2022

The Honorable Anne M. Gobi
Joint Committee on Higher Education Senate Chair
24 Beacon Street
Room 413-A – State House
Boston, MA 02133

The Honorable David M. Rogers
Joint Committee on Higher Education House Chair
24 Beacon Street
Room 43 – State House
Boston, MA 02133

Mr. Michael D. Hurley
Senate Clerk
24 Beacon Street
Room 335 – State House
Boston, MA 02133

Mr. Steven T. James
House Clerk
24 Beacon Street
Room 145 – State House
Boston, MA 02133

RE: Innovation Voucher Program Fund Annual Report

Dear Madam Chairwoman, Mr. Chairman, and Sirs:

Massachusetts Development Finance Agency (MassDevelopment) is pleased to submit this fourth annual report of the Innovation Voucher Program Fund (Fund) as required by M.G.L. Chapter 75, s.45C. The Fund was established as of July 1, 2017, and regulations were promulgated on November 16, 2018. The Commonwealth has allocated $8 million to capitalize the Fund.

Across the five campuses of the University of Massachusetts (UMass), 90 Core Facilities enable faculty, students, and industry collaborators to access a broad array of equipment to enhance their R&D capabilities, address both basic and translational questions, deliver technologies and product candidates more rapidly, and become more competitive in

obtaining state, federal, foundation, and private funding. UMass may award vouchers to allow companies to use these Core Facilities for work that includes, but is not limited to, the construction of prototypes, testing, and market research, so long as this work furthers the goals of job creation, innovation, and economic development.

The Innovation Voucher Program Fund is held and administered by MassDevelopment and its moneys shall be deployed to:

> (A) reimburse UMass for vouchers that it may issue to eligible small corporations and startup companies for a portion of the cost of either or both of (1) their use of Core Facilities, or (2) their contract for work to be performed by UMass using the Core Facilities; and
>
> (B) reimburse MassDevelopment for its direct costs of administering the Fund.

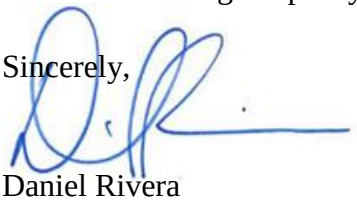
UMass submitted its first invoice under the program in January 2019, which, as reported in the Program's first annual report dated March 1, 2019, covered disbursements of $419,217.91 against 43 voucher requests made from Fund inception to February 28, 2019.

The second annual report submitted on March 1, 2020 demonstrated that from March 1, 2019 through February 29, 2020, four UMass campuses submitted 214 reimbursement requests against the vouchers issued to 109 companies for which total reimbursement of $1,254,593.19 was approved.

The third annual report submitted on March 1, 2021 demonstrated that from March 1, 2020 through February 28, 2021, four UMass campuses submitted 234 reimbursement requests against the vouchers issued to 129 companies for which total reimbursement of $1,683,480.81 was approved.

The attached annual report summarizes the progress that MassDevelopment has made with respect to the Fund from March 1, 2021 to February 28, 2022. During this period, four UMass campuses submitted 293 reimbursement requests against the vouchers issued to 140 companies for which total reimbursement of $2,265,562.85 was approved. UMass has reported the following details summarizing the vouchers against which disbursements were made during the past year.

Sincerely,



Daniel Rivera
President and CEO

University of Massachusetts, Amherst

The University of Massachusetts, Amherst awarded 126 vouchers to 60 companies requesting reimbursements totaling $721,175.53. The following details each voucher:

1. **ACTnano, Inc.** was awarded two vouchers totaling $375. The Fund allowed ACTnano, a global leader in protective nanocoatings for automotive and consumer electronics, to develop and test products with technical rigor. It also provided an opportunity for the company's engineers to acquire skills in operating multiple analytical instruments.

2. **Adaviv Inc**. was awarded $681. The Fund allowed Adaviv, a company developing hardware-enabled, predictive-analytics for indoor farming, to prototype and iterate quickly as it develops and brings its product to market with the goal of reducing crop losses in indoor agriculture. The program has given the company access to high-quality additive manufacturing methods at a price it can afford, enabling the company to develop sensing solutions for its customers' needs.

3. **AM 3D & CNC Fabrication LLC** was awarded three vouchers totaling $932.83. The Fund allowed AMD 3D & CNC Fabrication, a contract manufacturer with a specialty in prototyping, to implement solutions and deliver 3D-printed parts quickly and efficiently to its customers.

4. **American River Nutrition, Inc**. was awarded $337.50. The Fund allowed American River Nutrition, a company whose mission is to deliver the highest-quality nutritional products based on sound scientific research, to have valuable analysis performed at a very reasonable cost on a new product that will increase its sales, profits, and workload, leading to new hires.

5. **Ankaa Therapeutics LLC** was awarded two vouchers totaling $4,117.47. The Fund allowed Ankaa, a leader in developing targeted small molecule drugs for personalized therapy, to explore covalent drugs against several important targets in autoimmune and cancer treatments by looking at several proteins in parallel, which would have been more challenging and expensive if the voucher was not available.

6. **Aspen Products Group, Inc.** was awarded $360. The Fund allowed Aspen Products, a developer of innovative materials technologies and products that support the production of clean energy, clean water, and clean air, to efficiently scale up roll-to-roll membrane production from a batch to a continuous process.

7. **Asymmetrex, LLC** was awarded four vouchers totaling $46,484.25. The Fund allowed Asymmetrex, a company with a mission of advancing innovative adult tissue

stem cell technologies to applications in stem cell medicine and drug development, to conduct cell culture analyses that are essential for the development of a first-in-kind technology for determining the specific dosage of therapeutic stem cells. The work supported by the voucher program will help the company fulfill the specific goals of two federally funded research grants awarded for the development of enabling technologies for increasing progress in the cell biomanufacturing industry and stem cell medicine.

8. **Biomirex, Inc**. was awarded $15,862.70. The Fund allowed Biomirex, a drug discovery company that is focused on the development of antibody-based therapeutics, to accomplish a unique analytical task: the staff at the WET Center were able to provide and prepare the samples needed for the company's R&D team to develop antibodies for its immuno-assays.

9. **BioSafe R&D, LLC** was awarded two vouchers totaling $87,928.05. The Fund allowed BioSafe R&D to shift target markets for commercialization of its peroxyacetic acid products from the wastewater industry to potable drinking water. The WET Center allowed the company to thoroughly test its products against real-world conditions and helped troubleshoot key issues.

10. **Boston Meats, Inc.** was awarded $225. The Fund allowed Boston Meats, a company developing technologies to create texture in alternative meat products through a sustainable and scalable process, to access world-class staff and capabilities that it would not be able to afford or even find on its own. This enabled the company to prototype 3D-printed parts quickly and efficiently, building its business faster while preserving resources.

11. **BrainStem Biometrics Inc.** was awarded three vouchers totaling $2,910.09. The Fund allowed BrainStem Biometrics, a company that has developed a unique sedation-monitoring system that may allow clinicians to adjust medications to achieve target sedation levels using patent-protected technology based on Ocular microtremor (OMT), or small nano-scale neurological impulse waves that emanate from deep inside the brainstem, to redesign its wearable neurosensor. The work is leading to a lower-cost, higher-performance sensor that is optimized for additive manufacturing processes. Digital additive manufacturing will also provide BrainStem Biometrics with greater flexibility as it increases the pace of product development to launch a range of sensor systems optimized for various clinical applications.

12. **BSS Additive** was awarded $907.95. The Fund allowed BSS Additive, a company developing additive manufacturing technologies that recycle scrap metals into 3D-printing powders at the Berkshire Innovation Center, to offset the high costs of core

research and hire more people, thereby supporting innovation in a rapidly emerging field.

13. **Catch the Sun Designs** (Olive Barber) was awarded four vouchers totaling $1,979.88. The Fund allowed Catch the Sun Designs, a small business making one-of-a-kind whimsical sun catchers inspired by nature, to access and use a laser cutter to create the base for the company's product.

14. **Clean Crop Technologies, Inc.** was awarded seven vouchers totaling $7,081.69. The Fund allowed Clean Crop Technologies, a company using cold plasma chemistry to ionize a food-safe gas, creating short-lived and highly reactive molecules that quickly destroy pathogens without harming food quality, to refine its technology and treatment parameters, completely transforming the company's approach to treatment and research.

15. **Cofab Design LLC** was awarded two vouchers totaling $3,193.69. The Fund allowed Cofab Design, a small design and engineering consultancy, to access flexible, technically sophisticated local partners and vendors, quickly turn around projects, and add considerable technical value to its work that it would be unable to sustain in-house.

16. **Creative Neurology, LLC** was awarded two vouchers totaling $2,883.51. The Fund allowed Creative Neurology, an internationally acclaimed organization that ignites creativity to take back control of symptoms in people with Parkinson's disease, to provide tangible solutions to its patient population through innovative products which allow patients to live better with their symptoms instead of feeling burdened by them.

17. **Dap Management** was awarded three vouchers totaling $3,506.76. The Fund allowed Dap Management to access technical resources that made it possible to collaborate with a multinational medical technology customer to develop necessary components using 3D-printed parts in support of a new product.

18. **Datacule Inc.** was awarded $1,012.51. The Fund allowed Datacule, a company that provides a new solution for securely archiving digital data, to access equipment to test a component of its new technology.

19. **DeepCharge, Inc.** was awarded three vouchers totaling $13,511.20. The Fund allowed DeepCharge, a company building functionally superior wireless charging devices, to successfully launch its phase I and II pilot demonstrations in a coworking space by using 3D-printed parts.

20. **Diemat, Inc.** was awarded four vouchers totaling $11,162.40. The Fund allowed Diemat, a company that specializes in the development and manufacturing of innovative adhesive and sealing materials to serve the electronic packaging industry, to research polymer and nano materials for the semiconductor and energy storage industries.

21. **Embr Labs Inc**. was awarded five vouchers totaling $49,997.54. The Fund allowed Embr Labs, a leader in thermal technology and creator of the Wave bracelet, to form meaningful research partnerships and validate its technology to the highest scientific standards. The work supported by the voucher program will help the company reach a broader audience with its consumer product, apply for follow-on funding to continue scientific collaboration, and secure the investment needed to grow to a global scale.

22. **Empower Robotics Corporation** was awarded $1,422.01. The Fund allowed Empower Robotics, a startup company that develops wearable support gear for heavy-industry workers, to access 3D-printing capabilities to accelerate development by affordably and reliably providing different size options for test subjects.

23. **Felsuma, LLC** was awarded $405. The Fund allowed Felsuma to experiment with different designs to help launch its flagship product - an attractive and reusable wall-mounting product.

24. **Folia, Inc.** was awarded six vouchers totaling $9,651.08. The Fund allowed Folia to develop, characterize, and optimize a metallic nanoparticle coating for the development of antiviral masks and to offer guidance on materials handling to its industrial partners.

25. **Fornax Biotech LLC** was awarded $15,899.41. The Fund allowed Fornax Biotech, a Worcester-based startup company focusing on developing advanced applications of Next-Generation Sequencing, to facilitate R&D in pharmaceuticals and systematically evaluate its proof-of-concept technologies.

26. **FTL Labs Corporation** was awarded four vouchers totaling $10,624.19. The Fund allowed FTL Labs, a research, development, and management firm, to free up capital to develop more prototypes and meet critical project goals, which in turn has positioned the company better to pursue additional government funding solicitations.

27. **GALY CO.** was awarded two vouchers totaling $1,324. The Fund allowed GALY, a startup biotech company with a proprietary method of sustainable cotton production, to expand its research endeavors toward rapidly growing the company and successfully completing a Series A financing.

28. **Huck House LLC** was awarded $1,494.54. The Fund allowed Huck House to design and build its sporting goods using detailed 3D-printed prototypes.

29. **Hyalex Orthopaedics, Inc.** was awarded $1,750. The Fund allowed Hyalex Orthopaedics, which is developing transformational synthetic cartilage technology and implant systems for diseased and damaged joints, to rapidly develop a unique test that has provided critical insight to the development of its product and to accelerate its R&D efforts.

30. **Ichosia Biotechnology, Inc.** was awarded five vouchers totaling $72,346.14. The Fund allowed Ichosia Biotechnology, a company developing a cost-effective method of mass producing a naturally derived red blood cell – called Erythrosyn – to support health care providers and patients in need, to accelerate its research and further develop its technology.

31. **Innovative Wellness Systems Inc.** was awarded four vouchers totaling $79,441.68. The Fund allowed Innovative Wellness Systems, a smart insole and data analytics startup looking to solve biomechanical problems, to extend its non-dilutive funding toward the development of a medical health technology.

32. **Instaversal MFG Corporation** was awarded $13,207.50. The Fund allowed Instaversal, a company focusing on high-volume part production processes for plastic injection molding using proprietary predictive modeling, design, and additive manufacturing techniques to bring conforming cooling technology to scale, to iterate quickly through its R&D cycles by trying new materials alongside unique conformal cooling designs and enabling first-time pilot programs with new customers.

33. **J E Robison Service Co., Inc.** was awarded $1,758.47. The Fund allowed J E Robison Service Co., New England's top Bosch Car Service shop, specializing in Bentley and Rolls-Royce, Land Rover, BMW, Mercedes, and Jaguar, to take advantage of emerging technologies like 3D-printing.

34. **Mass Additive Manufacturing LLC** was awarded $1,361.25. The Fund allowed Mass Additive Manufacturing, a small business focusing on advancing applications of additive manufacturing, to increase R&D efforts, develop a prototype, and collect data for future ventures.

35. **Matterworks Inc** was awarded two vouchers totaling $28,911.52. The Fund allowed Matterworks, a company enabling scalable metabolomics through AI and analytical chemistry to accelerate therapeutic research, development, and manufacturing, to

conduct critical R&D necessary to bring its metabolomics technology to market through the use of a high-end mass spectrometer.

36. **Mitchell Engineering, Inc.** was awarded $9768.75. The Fund allowed Mitchell Engineering, a company focused on special machinery and sub-contract machining to efficiently produce complex parts, to access additive manufacturing resources such as metal printing technologies to create better parts with greater value for its customers.

37. **Multisensor Scientific, Inc.** was awarded three vouchers totaling $11,406.09. The Fund allowed Multisensor Scientific, a company offering a non-thermal optical gas imaging camera platform, to take advantage of fast additive manufacturing to iterate quickly and try various designs to develop products for its customers. It has also provided an opportunity for its engineers to acquire skills in operating multiple analytical instruments.

38. **NanoLab, Inc.** was awarded two vouchers totaling $6,464.37. The Fund allowed NanoLab, Inc., a product development and contract research organization with a specialization in nanotechnology-enabled products, to have affordable access to equipment to further develop its ink technology and drive it towards a commercially viable product.

39. **New Equilibrium Biosciences, Inc.** was awarded two vouchers totaling $16,875. The Fund allowed New Equilibrium Biosciences, a company dedicated to developing new medicines through cutting-edge science and cross-disciplinary collaborations (by leveraging its computational-experimental platform to discover lead drug candidates that regulate intrinsically disordered proteins implicated in cancers and neurodegenerative disorders), to develop a novel machine learning-based computational framework for investigating drug-target interaction. This framework allows the company to accurately predict the ensemble of complex and flexible biomolecules in the field of drug discovery.

40. **Nibble, LLC** was awarded $30,398.90. The Fund allowed Nibble, LLC, a startup company developing chlorine sensors, to quickly gain knowledge of existing water quality testing devices/sensors, determine direction of product development, and develop a real-time chlorine sensor prototype.

41. **Obaggo Recycling, LLC** was awarded $196.88. The Fund allowed Obaggo Recycling to commercialize its recycling innovation: the world's first plastic bag and packaging film recycling appliance that converts plastic bags and packaging film into compressed bag discs. The company’s product will help the environment by diverting hundreds of tons of plastics from the waste stream into the recycling stream.

42. **Onvector LLC** was awarded $853.65. The Fund allowed Onvector, a company that develops non-chemical water treatment technologies (utilizing a plasma hydrocyclone harnessing the power of arc lightning) to destroy the most hard-to-treat contaminants in water and wastewater such as PFAS and other contaminants of concern, to dramatically improve its technology. Custom parts that were previously unaffordable or impractical to make have now become a tangible reality for the company via the high-quality printing processes at UMass.

43. **Optical Waters LLC** was awarded $1,877.24. The Fund allowed Optical Waters, a woman-owned seed-stage business offering custom ultraviolet optical fiber solutions for disinfecting small channels and complex geometries (so its customers can deliver clean and safe products to their end users), to perfect its product while keeping its technology in house.

44. **Optodot Corporation** was awarded three vouchers totaling $5,310. The Fund allowed Optodot, a company continually seeking to innovate in the commercialization of next-generation products based on nanoporous membranes and infrared organic coatings, to quickly pivot after its contract coater closed, leaving the company without a pilot manufacturing partner in the face of impending deadlines from its commercial partners. The company seamlessly transitioned its development activities to UMass to meet project objectives and timelines, running five different coating trials with an average of four different designs at each trial.

45. **Pioneer Valley Coral & Natural Science Institute Inc.** was awarded $109.01. The Fund allowed the company, which seeks to bring sustainability to the marine reef industry by growing aquacultured corals, access to experienced and professional staff and state-of-the-art 3D-printing equipment to complement its current capabilities.

46. **Power for Humanity, Inc.** was awarded $193.08. The Fund allowed Power for Humanity, a company developing new technologies that improve the performance of existing battery systems, to support the fabrication of prototypes crucial to its research.

47. **Purrfect Portal, Inc.** was awarded two vouchers totaling $4,144.08. The Fund allowed Purrfect Portal, a manufacturer of interior cat doors, to affordably design and 3D-print its product in the United States.

48. **RevBio Inc.** was awarded four vouchers totaling $2,346.76. The Fund allowed RevBio to make significant advances in its research on, and prototyping of, a novel

bone-adhesive biomaterial technology which it intends to commercialize for medical use.

49. **ReviveMed Inc.** was awarded two vouchers totaling $26,014.85. The Fund allowed ReviveMed, a company using artificial intelligence and data from metabolites (small molecules in the human body) for drug discovery purposes, to collect metabolomics data for hundreds of patients suffering from fatty liver diseases to help find novel therapeutic targets.

50. **Rx3DPrint Inc**. was awarded $1,863.00. The Fund allowed the medical device company to design and manufacture 3D-printed products without huge initial startup costs associated with a new business.

51. **Saralee Hofrichter** was awarded $315. The Fund allowed Ms. Hofrichter, who makes crystal grid kits, to create a new product for her business and customers.

52. **SIP Products, LLC** was awarded $181.58. The Fund allowed SIP Products to explore more advanced product design and prototyping.

53. **Soliyarn, LLC** was awarded $1,832.51. The Fund allowed Soliyarn, a company developing novel conductive, waterproof, and antimicrobial textiles, to make quality improvements to bring competitive products to the market.

54. **SpiderCuff USA, LLC** was awarded $2,643.75. The Fund allowed SpiderCuff, developer of a 21st-century handcuff, to extend its non-dilutive funding toward the development of a study aimed at developing a dataset that can be used to evaluate the effectiveness of its product.

55. **TinyPilot, LLC** was awarded four vouchers totaling $44,099.60. The Fund allowed TinyPilot, a company that provides affordable and accessible remote management solutions for servers via a kernel-based virtual machine (KVM) over IP device, to access expertise and resources in 3D printing that would otherwise be out of reach.

56. **Volta Labs, Inc.** was awarded $375.01. The Fund allowed Volta Labs, a biotechnology company developing accessible gene sequencing technologies relying on low-cost alternatives for consumables, to characterize silicone-coated films via Atomic Force Microscopy.

57. **Vuronyx Technologies LLC** was awarded $150.00. The Fund allowed Vuronyx Technologies, a company focused on commercialization of novel material science-

based technologies and products, to perform gas chromatography-mass spectrometry experiments on samples to evaluate for content.

58. **X2O Corporation** was awarded two vouchers totaling $55,026.27. The Fund allowed X2O Corporation, which provides a crowdsourced approach to water-quality sensing, to advance the development of its early-stage technology while at the same time utilizing additional resources to hire interns to assist with the project. It has also allowed X2O to further develop its product into a working prototype.

59. **YOUBIQ Inc**. was awarded three vouchers totaling $2,481.34. The Fund allowed YOUBIQ, a company offering technology to support automated capture processing and publishing of professional-quality 360-degree panoramas with a smartphone, to run through a number of prototyping and product iterations that it otherwise would not have been able to afford.

60. **ZwitterCo, Inc.** was awarded $570.00. The Fund allowed ZwitterCo, a Massachusetts startup venture developing membrane technology and products for filtration applications, to perform custom coating processes and testing to deliver prototypes to specific industry customers in order to evaluate performance and cost of implementation.

University of Massachusetts, Boston

The University of Massachusetts, Boston awarded 11 vouchers to four companies requesting reimbursements totaling $170,204.56. The following details each voucher:

1. **Jura Bio, Inc.** was awarded $898.15. The Fund allowed Jura Bio, a company creating a novel therapeutic platform of cell therapies meant to target pathogenic immune cells, to study and profile autoimmune patient T Cell Receptor and B Cell Receptor sequences, along with full transcriptomics data to interrogate the immunological identities of pathogenic lymphocytes.

2. **PineTree Therapeutics, Inc.** was awarded six vouchers totaling $142,473.38. The Fund allowed PineTree Therapeutics, a biotechnology company developing disruptive innovations to treat unmet therapeutic needs in oncology and infectious diseases, to discover and develop a bispecific or multispecific antibody that potentially treats solid cancers.

3. **Spectrus LLC** was awarded three vouchers totaling $24,382.78. The Fund allowed Spectrus, a contract research organization providing high-quality mass spectrometry results, to access quantitative proteomics using TMT (tandem mass tag) labeling. This

allows the organization to compare treatment conditions and collect replicate data for a drug-development project.

4. **Window Therapeutics, Inc.** was awarded $2,450.25. The Fund allowed Window Therapeutics, an oncology therapeutics platform company that is creating next-generation immunotherapies and targeted therapies through a macromolecular pro-drug platform technology, to perform extensive chemical synthesis which needs thorough physicochemical characterization by means of a Nuclear Magnetic Resonance (NMR) machine. This research project requires hydrogen and carbon-quantitative characterization of synthesized intermediate molecular building blocks and final drug candidates to confirm chemical identities and assess purities.

University of Massachusetts, Lowell

The University of Massachusetts, Lowell awarded 111 vouchers to 49 companies requesting reimbursements totaling $729,837.32. The following details each voucher:

1. **ACTnano, Inc.** was awarded four vouchers totaling $7,943.51. The Fund allowed ACTnano, a company that develops nanocoatings for waterproofing electronics and fabrics and self-cleaning, anti-icing, and anti-fogging glass, to characterize coatings and to allow its engineers to acquire skills in operating multiple analytical equipment.

2. **Advanced Silicon Group, Inc.** was awarded four vouchers totaling $66,712.93. The Fund allowed Advanced Silicon Group, a company developing the next-generation silicon nanowire biosensor designed to measure protein concentration in a solution, to use the Nanofabrication Lab to make nanowires and the Materials Characterization Lab to look at these nanowires in the scanning electron microscope.

3. **Akita Innovations LLC** was awarded two vouchers totaling $4,366.89. The Fund allowed Akita Innovations, a company that engages in contract research and development for commercial and government customers, to advance research, develop sophisticated prototypes, and build its commercial services.

4. **AmberWave, Inc.** was awarded four vouchers totaling $54,584.95. The Fund allowed AmberWave, a solar energy company, to access processing and analytical tools to develop thin, lightweight, and flexible high-efficiency solar cell technology for use in commercial building rooftop solar energy applications and portable power generation used by soldiers.

5. **Anodyne Nanotech, Inc.** was awarded two vouchers totaling $19,765.50. The Fund allowed Anodyne Nanotech, a venture-backed, preclinical-stage biotech company developing differentiated, transdermal forms of high-value drugs, to access

equipment at the analytical chemistry lab at UMass Lowell rather than outsourcing the work – expediting the research processes and allowing the company to make quick decisions.

6. **Bambu Vault LLC** was awarded two vouchers totaling $1,881.74. The Fund allowed Bambu Vault, a company performing structural characterization of organic dyes and other small organic compounds, to streamline its R&D and free up capital for supplies as it moves toward commercialization of its products.

7. **Beltronics Inc.** was awarded $5,571.75. The Fund allowed Beltronics, a manufacturer of process control and yield improvement systems with a line of products for the manufacture of etched and printed organic and non-organic electronics, to perform precise measurements of a mask on a scanning electron microscope.

8. **Caraway Therapeutics, Inc.** was awarded $7,325. The Fund allowed Caraway Therapeutics, an emerging biopharmaceutical company pursuing novel approaches for the treatment of debilitating neurodegenerative and rare diseases by enhancing cellular clearance, to generate data and to access scientific expertise and individual support which would be prohibitively expensive or simply not available. The data helps the company explore new disease indications for its drugs and identify biomarkers that may be used clinically.

9. **Casterbridge Pharmaceuticals, Inc.** was awarded two vouchers totaling $4,132.13. The Fund allowed Casterbridge Pharmaceuticals, a specialty biotech company focused on the development of small-molecule anti-infective drugs directed at important human disease, to use instruments to analyze and characterize small organic molecules. The Core Facilities at UMass Lowell and the Voucher Program were instrumental in Casterbridge's relocation from the BioGenerator facility in Saint Louis to UMass M2D2.

10. **Cellino Biotech, Inc.** was awarded two vouchers totaling $16,922.88. The Fund allowed Cellino Biotech, an engineering-driven biotech company, to perform coating deposition and annealing experiments for biological coverslip. Cellino Biotech has prototyped a series of optical coatings at UMass Lowell to be used in its laser-based cell culture platform.

11. **DialyFlux, LLC** was awarded four vouchers totaling $65,661.76. The Fund allowed DialyFlux, a company designing, fabricating, and testing a microstructured surface on a silicon wafer for the rapid separation of plasma from human blood without

centrifugation, to fabricate and characterize novel microstructures to company specifications.

12. **Dogodan Therapeutics, Inc.** was awarded two vouchers totaling $52,202.69. The Fund allowed Dogodan Therapeutics, a company utilizing the latest advances in biology, genomics, and computing to deliver revolutionary new treatments for diseases such as cancer and other indications with the highest unmet medical need, to test its "locus regulators" in more than 12 cell assays, leading to early proof-of-concept data needed to obtain additional funding for progressing novel treatments.

13. **Electrified Thermal Solutions, Inc.** was awarded $1,899.00. The Fund allowed Electrified Thermal Solutions, a company developing the Joule Hive, a new energy storage technology that converts surplus zero-carbon electricity into heat, to improve efficiency and explore more materials. As an early-stage company with limited funding, the Fund allowed the company to save on operating and testing costs and therefore purchase an additional high-temperature furnace and raw materials for accelerated and more comprehensive testing.

14. **Erbi Biosystems, Inc.** was awarded two vouchers totaling $12,415.46. The Fund allowed Erbi Biosystems, a developer of innovative, small-scale, automated, and high-performance cell culture systems, to efficiently run more experiments and accelerate R&D efforts.

15. **Evolve Diamonds LLC** was awarded four vouchers totaling $15,041.81. The Fund allowed Evolve Diamonds, a company that supplies diamond, diamond processing, metrology, and application engineering for laboratory-grown diamonds, to characterize diamond electronics – allowing the company to extend and diversify its product offerings.

16. **Factorial Inc.** was awarded two vouchers totaling $1,631.73. The Fund allowed Factorial, a company developing solid-state battery technology that is safer and offers up to 50 percent greater driving range than current lithium-ion technology, to advance its research in solid-state batteries by providing a wide range of advanced machinery, helping the company to grow from a small startup to a small-scale production facility.

17. **Flexomics LLC** was awarded three vouchers totaling $11,058.75. The Fund allowed Flexomics, a Boston-based biotech startup developing an innovative high-throughput screening platform capable of simultaneous phenotyping and genotyping more than 500,000 individual cells, to perform 12 Next Generation Sequencing (NGS) runs that will enable Flexomics to continue the development of high-diversity molecular barcodes to analyze specific biomarkers of interest.

18. **Glycologix, Inc.** was awarded four vouchers totaling $30,069.19. The Fund allowed Glycologix, an emerging biotechnology company targeting locally delivered therapeutics for the protection and repair of soft tissues, to use the Nuclear Magnetic Resonance (NMR) and Thermal Analysis and Mechanical Properties Labs in self-service mode to run samples.

19. **Glyscend, Inc.** was awarded three vouchers totaling $26,830.89. The Fund allowed Glyscend, a company inspired by the remarkable efficacy of gastric bypass (bariatric) surgery in correcting the metabolic disorder associated with Type 2 Diabetes (T2D), to test and develop a patient-friendly therapy to mimic the beneficial effects of bariatric surgery to improve blood glucose and reduce body weight, while building upon the standard of care for T2D.

20. **Honeycomb Biotechnologies, Inc**. was awarded three vouchers totaling $48,833.25. The Fund allowed Honeycomb Biotechnologies, a company that develops solutions to remove barriers and expand the opportunities for single-cell analysis to basic, translational, pre-clinical, and clinical researchers throughout the world, to access sequencing services to support R&D and product development.

21. **Integral BioSystems, LLC** was awarded $1,505.88. The Fund allowed Integral BioSystems, a company whose specialties include the development of innovative micro-particulate and nano-particulate sustained-release drug formulations, to use scanning electron microscope analysis to confirm their structures.

22. **IVIVA Medical, Inc.** was awarded $1,167.25. The Fund allowed IVIVA Medical, which was founded with the goal of developing autologous tissue constructs as a solution to end-state renal disease (ESRD), to access cutting-edge equipment to drastically increase the sophistication of its materials characterization.

23. **KnipBio, Inc**. was awarded two vouchers totaling $3,396.00. The Fund allowed KnipBio, a company evaluating the impact of a dietary ingredient on the gut microbiota of Atlantic salmon and barramundi raised in recirculated aquaculture systems, to initiate the molecular research needed to better understand how its product interacts with the biology of the fish.

24. **Kula Bio, Inc.** was awarded two vouchers totaling $4,011.19. The Fund allowed Kula Bio, a leader in sustainable nitrogen solutions helping farmers improve crop yield and reduce environmental impact through products such as a biofertilizer that boosts a naturally occurring process to deposit meaningful amounts of nitrogen in the

soil, to design and develop methods that advance its research and improve the skills of its employees.

25. **Lionano SE Inc.** was awarded two vouchers totaling $3,231.88. The Fund allowed Lionano SE, a company developing advanced novel materials for lithium-ion batteries, to accelerate the development and characterization of its advanced solid-state battery materials portfolio.

26. **MicroContinuum, Inc.** was awarded two vouchers totaling $191.25. The Fund allowed MicroContinuum, Inc., a company offering precision micro- and nano-imprinting and patterning using innovative, patented roll-to-roll and batch manufacturing technologies, to create a plasma etching process.

27. **Mioe Inc.** was awarded four vouchers totaling $48,241.14. The Fund allowed Mioe, a company that makes high-speed vertical-cavity surface emitting laser (VCSEL) linear arrays for data center application and 2D arrays for smart phone facial recognition application and driverless car application, to fabricate a complete semiconductor laser device.

28. **Nanolab, Inc.** was awarded three vouchers totaling $8,546.63. The Fund allowed Nanolab, a company developing a nanotube-based friction pad for robotic handling of silicon wafers, to use UMass Lowell's Emerging Technologies and Innovation Center (ETIC) to develop and test products in a clean room environment.

29. **Neutral Physics Corporation** was awarded three vouchers totaling $8,977.13. The Fund allowed Neutral Physics, a company formed to commercialize Accelerated Neutral Atom Beam technology in the semiconductor industry, to access equipment to advance its research and development.

30. **Nth Cycle, Inc.** was awarded three vouchers totaling $9,128.44. The Fund allowed Nth Cycle, a company developing a state-of-the-art electrochemical filter to close the loop on the supply chain of precious metals from various feed sources such as Li batteries and permanent magnets, to characterize potential feed sources for its process, hire interns, and train its employees.

31. **Nuclease Probe Technologies, Inc.** was awarded $338.06. The Fund allowed Nuclease Probe Technologies, a company that identifies bacteria directly from the blood of patients suspected of having life-threatening bloodstream infections and analyzes the bacteria to determine the most appropriate antibiotic therapy, to estimate the quality of DNA/RNA isolated from different specimens .

32. **OPT Industries, Inc.** was awarded $220.17. The Fund allowed OPT Industries, a company combining computational design, automation engineering, and material science to manufacture materials with micron-scale precision, to perform a materials-screening project to understand the compositions, stabilities, and thermal properties of a product.

33. **Palomaki Consulting, LLC** was awarded $127.50. The Fund allowed Palomaki Consulting, a company with expertise in quantum dots and nanomaterials for optical applications, to work on the development of high-efficiency, low-cost facial coverings to prevent the spread of Covid-19 and other airborne pathogens.

34. **Power for Humanity, Inc.** was awarded two vouchers totaling $6,773.27. The Fund allowed Power for Humanity, a company developing new technologies that improve the performance of existing battery systems, to fabricate prototypes of film devices using material deposition.

35. **Privo Technologies, Inc.** was awarded three vouchers totaling $6,874.95. The Fund allowed Privo Technologies, a biotechnology company that consists of dedicated scientists, researchers, engineers, and businesspeople who have all recognized the severe need for an improved standard of care for cancer patients, to use gamma irradiation to expand its research for health care products to be applied during tumor resection.

36. **Pulsar Bio Inc.** was awarded two vouchers totaling $14,577.61. The Fund allowed Pulsar Bio, a company developing an early-stage pharmaceutical screening platform, to access the resources necessary to more quickly develop a proof of concept by iterating through more designs while keeping to its timelines.

37. **Pykus Therapeutics, Inc.** was awarded $633.75. The Fund allowed Pykus Therapeutics, a startup company developing hydrogels for ocular surgery, to synthesize and characterize polymeric materials to make hydrogels while simultaneously exploring drug delivery using the hydrogels.

38. **Radical Plastics, Inc.** was awarded two vouchers totaling $6,359.59. The Fund allowed Radical Plastics, a company developing biodegradable plastics, to test materials-related properties, such as thermal properties and metals used in the catalyst formulation of its product. The support provided allowed Radical Plastics to optimize its first product's performance and provide a pilot product for field testing by local farmers and universities.

39. **RevBio Inc.** was awarded two vouchers totaling $8,019.71. The Fund allowed RevBio, a company developing and commercializing a novel, injectable, bioresorbable bone adhesive, to access the facilities to complete benchtop, animal, and biocompatibility testing in support of human clinical use.

40. **Soliyarn, LLC** was awarded two vouchers totaling $15,812.07. The Fund allowed Soliyarn, a company developing novel conductive, waterproof, and antimicrobial textiles, to develop more prototypes and validate a new product line through material characterization.

41. **Tarveda Therapeutics, Inc.** was awarded $1,000.00. The Fund allowed Tarveda Therapeutics, an early-stage biotech company, to advance its discovery platform for cancer therapeutics.

42. **TriAxia Health, Inc.** was awarded $4,859.73. The Fund allowed TriAxia Health, a company that provides rare disease data and analytics to providers, biopharmas, and payers, to bring an additional health system onto its platform and sequence DNA and RNA for an additional 96 patients.

43. **Verdox, Inc.** was awarded two vouchers totaling $2,938.00. The Fund allowed Verdox, a company commercializing its electro swing adsorption (ESA) platform technology that removes carbon dioxide from industrial emissions and the air, to perform molecular weight characterization of novel polymer/oligomer materials.

44. **Versatope Therapeutics, Inc.** was awarded three vouchers totaling $12,668.27. The Fund allowed Versatope Therapeutics, a biotechnology company developing vaccines and immuno-therapeutics, to expand its research and development activities and to reach proof-of-concept milestones sooner.

45. **VPT Rad** was awarded five vouchers totaling $78,000.00. The Fund allowed VPT Rad, an independent, Defense Logistics Agency-approved radiation and test services laboratory, to use the Radiation Laboratory Fast Neutron Irradiator to qualify electronic components for space application.

46. **Vuronyx Technologies LLC** was awarded two vouchers totaling $5,894.63. The Fund allowed Vuronyx Technologies, a company focused on commercialization of novel material science-based technologies and products, to characterize bio-based epoxy, elastomeric material and water samples with various analytical techniques, and to continue developing proof-of-concept prototypes for potential new products.

47. **Warner Babcock Institute for Green Chemistry LLC** was awarded two vouchers totaling $3,936.83. The Fund allowed Warner Babcock Institute for Green Chemistry, a company focused on the development and optimization of sustainable chemistry and material science technologies, to facilitate both the execution of paid research and development contracts with clients, and internally funded development and commercialization programs.

48. **Weddell Technologies, LLC** was awarded $17,132.24. The Fund allowed Weddell Technologies, a startup based in the M2D2 incubator at UMass Lowell developing multiplexed photonic integrated circuit (PIC) solutions for cancer immunotherapy, to create more prototypes at a lower expense.

49. **Young Biopharma, LLC** was awarded two vouchers totaling $417.38. The Fund allowed Young Biopharma, a biopharmaceutical company focused on developing revolutionary therapies that restore function and improve the lives of people with pain, to analyze and determine the purity of organic compounds from its synthetic effort.

University of Massachusetts Medical School, Worcester

The University of Massachusetts Medical School (UMMS) awarded 45 vouchers to 27 companies requesting reimbursements totaling $644,345.44. The following details each voucher:

1. **Ankaa Therapeutics, LLC** was awarded four vouchers totaling $25,688.70. The Fund allowed Ankaa Therapeutics, a company pioneering the development of targeted therapies to address drug resistance, to study the potency and selectivity of a novel small molecule inhibitor that has utility in cancer and autoimmune disease. The flow cytometry data will be helpful in providing translational data that could be applied to preclinical and possibly future clinical studies.

2. **Apic Bio, Inc**. was awarded $2,932.50. The Fund allowed Apic Bio, a small biotech startup advancing several novel gene therapies to treat Alpha-1 Antitrypsin Deficiency (Alpha-1), genetic Amyotrophic Lateral Sclerosis (ALS), and other central nervous system diseases, to perform deeper analyses of its drug products using sophisticated techniques that would otherwise be cost prohibitive, thereby allowing the company to better understand its therapies for the benefit of patients.

3. **Boan Boston LLC** was awarded $3,150.00. The Fund allowed Boan Boston, a small, dynamic team focused on the development of the next generation of antibody- and cell-based therapies, to perform confocal imaging analysis with the SCOPE facility at

the University of Massachusetts, Worcester to better characterize the molecular mechanisms underpinning its novel technology.

4. **BostonGene Corporation** was awarded three vouchers totaling $21,200.00. The Fund allowed Boston Gene, a company whose mission is to power health care's transition to personalized medicine (using AI-based molecular and immune profiling to improve the standard of care, accelerate research, and improve economics), to develop the first comprehensive Next-Generation Sequencing assay for cancers without a solid tumor component, thereby providing treating oncologists with potential treatment options not currently available.

5. **Bowen BioScience, LLC** was awarded two vouchers totaling $4,757.25. The Fund allowed Bowen BioScience, a company engaged in developing monoclonal antibodies as cancer diagnostics or therapeutics, to sequence DNA samples, analyze properties of antibodies, and determine the best sequences.

6. **Cherry Med and Mansfield Bio-incubator, Inc.** were awarded two vouchers totaling $15,025.72. The Fund allowed Cherry Med to scale up production of a novel material that will need to be validated and characterized for purity of composition and reproducibility of activity.

7. **Claritas Bio, Inc.** was awarded $68,580. The Fund allowed Claritas Bio, a pharmaceutical research and development company, to access equipment and expertise that will significantly strengthen its preclinical studies on therapeutic candidates.

8. **Flagship Pioneering, Inc.** was awarded $31,860. The Fund allowed Flagship Pioneering, a startup company focusing on exploring novel mechanisms to prevent catastrophic infection of humans by pathogenic microorganisms, to facilitate its early research programs and accelerate proof-of-principal studies.

9. **Frontera Therapeutics, Inc.** was awarded $8,001.50. The Fund allowed Frontera Therapeutics, a leader in life-changing therapeutics that reach patients around the globe, to generate critical materials for gene therapy research and development using state-of-the-art facilities and equipment.

10. **Gel4Med, Inc.** was awarded $10,497.00. The Fund allowed Gel4Med, a company developing a biomaterial technology, to access services and equipment at reasonable prices.

11. **Glyscend, Inc.** was awarded two vouchers totaling $57,517.50. The Fund allowed Glyscend, a company inspired by the remarkable efficacy of gastric bypass (bariatric) surgery in correcting the metabolic disorder associated with Type 2 Diabetes (T2D), to determine the retention and durability of Glyscend's therapeutic that will replicate the beneficial effects of Bariatric surgery via an orally administered polymer.

12. **GO Therapeutics, Inc.** was awarded $1,080.00. The Fund allowed GO Therapeutics, a company exploiting unique aspects of cancer cell biology to develop a new class of cancer therapies for previously intractable solid tumors, to use the UMass Flow Cytometry facility to develop its therapeutic discoveries from bench to bedside.

13. **Hessian Labs, Inc.** was awarded $3,975.00. The Fund allowed Hessian Labs, an early-stage biotech company with a promising novel diagnostic technology for cancer detection and monitoring, to verify important methodologies for protein selection, central to the development of its proteomic diagnostic assay.

14. **Inozyme Pharma, Inc.** was awarded two vouchers totaling $25,408.25. The Fund allowed Inozyme Pharma, a global leader in developing therapies for rare mineralization disorders, to perform additional research activities supportive of its internal therapeutic programs.

15. **Leveragen, Inc.** was awarded $6,157.50. The Fund allowed Leveragen, a Worcester-based startup company providing gene editing and genomic engineering services, to use sequencing platforms to characterize genetic models and antibodies derived from them.

16. **Nabla Bio, Inc.** was awarded four vouchers totaling $57,318.75. The Fund allowed Nabla Bio, a small biotech startup that focuses on building high-value therapeutic proteins for unmet patient needs by leveraging machine learning for protein design, to take advantage of expertise, equipment, and facilities to make mission-critical progress on the development of its technology by analyzing phenylalanine and trans cinnamic acid levels in the plasma of mice treated with the company's oral enzyme.

17. **New Equilibrium BioSciences, Inc.** was awarded $6,007.50. The Fund allowed New Equilibrium BioSciences, a company that designs therapeutics targeting currently undrugged proteins, to access resources and training in a variety of experimental and computational domains that accelerate its mission of developing new precision medicines for life-threatening diseases.

18. **NIRA BioSciences, Inc**. was awarded $67,500. The Fund allowed NIRA BioSciences, an exciting, fast-paced, early-stage biotechnology company focusing on

developing photo-immunotherapy for the treatment of inflammatory skin diseases, to accelerate the basic viability assessment of the NIRA technology, helping to define the correct technology path and evidence to support future external funding.

19. **Precidiag, Inc.** was awarded $75,000.00. The Fund allowed Precidiag, a precision therapeutics company, to conduct an important, preliminary study of fecal samples secured from Children with Autism Spectrum Disorder (ASD) and a Neurotypical Control Group. The data collected from this study will enable Precidiag to prepare its staff for future studies and provide the company with an initial dataset for research into linkages between human gut microbiota and ASD.

20. **Rectify Pharmaceuticals, Inc.** was awarded three vouchers totaling $104,980.50. The Fund allowed Rectify Pharmaceuticals, a company developing disease-modifying precision therapeutics for patients with serious genetic diseases, to have reserved access to the state-of-the-art cryo-electron microscopes at UMass, enabling drug discovery research.

21. **RegenX** was awarded $1,281.26. The Fund allowed RegenX, a promising early-stage biotech startup investigating the use of telocollagen for the repair of tendon defects, to determine if skin repair is a promising new avenue for exploration and future growth by enhancing the breadth of studies and histological data that the company is able to generate.

22. **SpadXTech LLC** was awarded $1,492.13. The Fund allowed SpadXTech, a company developing building technologies from biologically sourced materials, to run more samples and unequivocally validate its hypotheses, helping the company bring green and sustainable products to the marketplace.

23. **Synteny Therapeutics, Inc.** was awarded $450.00. The Fund allowed Synteny Therapeutics, a newly formed gene therapy company developing a new class of viral vectors, to gene edit human hematopoietic stem cells (HSCs) and determine whether insertion of a foreign gene at specific genomic locations (or loci) affects differentiation into erythrocytes. The immediate disease targets are non-malignant hematological diseases, particularly sickle cell. Performing this process at the core facility enables large-scale production volumes that reduce the cost-of-goods, thereby providing greater access for patients.

24. **Tiba Biotech LLC** was awarded $7,500.00. The Fund allowed Tiba Biotech, a company advancing the RNA medicine field with an improved approach to nucleic acid delivery, to perform sample characterization of its nanoparticle formulations at a microscopic level.

25. **Versatope Therapeutics, Inc.** was awarded three vouchers totaling $5,400.00. The Fund allowed Versatope Therapeutics, a biotechnology company developing vaccines and immuno-therapeutics, to obtain data to be used in the research and development of universal influenza vaccines and vaccines for other infectious diseases.

26. **Yurogen Biosystems LLC** was awarded four vouchers totaling $31,633.88. The Fund allowed Yurogen Biosystems, a company dedicated to producing premium antibodies and antibody-based products to meet the broad needs of its clients, to perform single B cell-based sorting and culture for monoclonal antibody discovery.