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TEXAS BIOMEDICAL
RESEARCH INSTITUTE

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TEXAS BIOMEDICAL
RESEARCH INSTITUTE

2019 ANNUAL REPORT



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4	PRESIDENT'S LETTER
6	BETTER OPPORTUNITIES. BETTER SCIENCE.
7	TEXAS BIOMED'S NEW FACULTY MEMBERS
10	2019 SCIENCE HIGHLIGHTS
12	THE VACCINE TIMELINES
14	SAN ANTONIO PARTNERSHIP FOR PRECISION THERAPEUTICS
15	FINANCIALS
16	GRANTS AND CONTRACTS
18	SCIENTIFIC REVOLUTION CAPITAL CAMPAIGN
20	CIRCLES OF GIVING
25	TEXAS BIOMEDICAL FORUM
27	FOUNDER'S COUNCIL
30	THE ARGYLE

Before the Storm: a year of growth and preparation

I write this in the middle of 2020, when it is challenging to reflect back on 2019 — a time that seems so long ago after the events of this year. But, it is important to reflect back to a time when the Institute was sharpening its focus and began the long road toward achieving its 10-year vision of establishing the world's leading infectious disease research institute. With the Institute's 10-year strategic plan in its infancy, the team was, in fact, preparing for this very moment in history.

The vision to be the go-to place for infectious disease research and development was aided by a concerted and strategic effort in 2019 to grow our *people, programs and places*, and grow we did. Since 2017, Texas Biomed has added 13 new faculty members. Our new faculty not only bring impressive grant portfolios and significant work on HIV, TB, flu, cancer and other related inflammatory diseases, along with veterinary medicine expertise, they bring with them a plethora of new ideas and a commitment to the Institute's culture of collaboration, while further fostering our core values of Teamwork, Integrity, Diversity, Excellence and Safety.

This culture of collaboration extended well beyond Texas Biomed's walls in 2019, as we became part of an important collaborative with Southwest Research Institute, UT Health San Antonio and the University of Texas at San Antonio. The San Antonio Partnership for Precision Therapeutics (SAPPT) is a new and unique initiative aiming to capitalize on San Antonio's bioscience strengths across the four institutions. SAPPT is bringing together early-stage researchers with translational researchers with clinicians and others to create a looped pipeline where information is fed across disciplines so that each stage informs the next and patient data improves and refines basic science and basic science drives better patient outcomes.

The role of research is to inform — to produce data that will inform the development of new diagnostics, therapies and vaccines, which makes our scientists teachers by default. As 2019 was coming to a close, we began hearing about a new virus emerging, and our scientists were spending a great deal of time reading and learning so that we were prepared to be

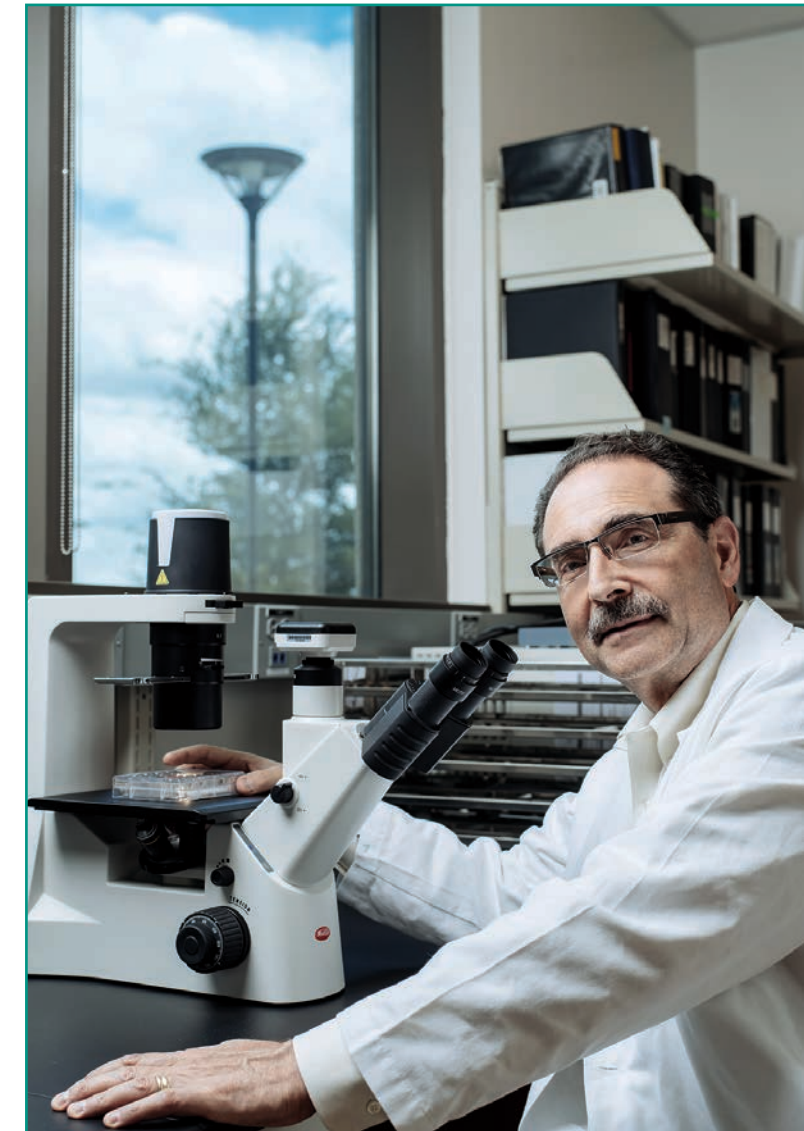
the science educators our community needed in 2020. We are continuing these teaching moments with a special section in this issue on the vaccine timeline. Our hope is that this timeline underscores the important role preclinical and early stage research done at Texas Biomed plays in the vaccine development process.

None of this teaching and research would be possible without community support. Texas Biomed is fortunate to have so many devoted supporters, who enabled the Institute to open new buildings in 2019, including a brand new BSL-3 laboratory that now houses COVID-19 research — research that would not have been possible without philanthropy for the building. The lab hosted an open house in May 2019, along with tours of a new marmoset housing facility and BSL-4 annex. Our community understands the value of science, and for that, we are eternally grateful.

While I can't predict how the rest of 2020 will play out, I can guarantee that science will be the hero of this story. I leave you with a familiar message, one I shared last year that still rings true today — Science contributes to our understanding of the world around us; it provides comfort and makes life easier; it is a means to an end...healthier lives generation after generation.



Larry Schlesinger, M.D.
President and CEO



SCIENCE CONTRIBUTES TO OUR UNDERSTANDING
OF THE WORLD AROUND US; IT PROVIDES COMFORT
AND MAKES LIFE EASIER; IT IS A MEANS TO AN END...
HEALTHIER LIVES GENERATION AFTER GENERATION.

Better Opportunities. Better Science.

Texas Biomedical Research Institute (Texas Biomed) launched its 10-year strategic plan in 2018 after a nearly year-long process of developing a comprehensive strategy for growth with a focus on infectious diseases. Constructed with input from faculty and staff members, the Institute's new direction in establishing a collaborative culture of multidisciplinary research is making strides, and the science community is taking notice. Since the plan has been in motion, the Institute has recruited 13 new faculty members, which has been the driving force behind the Institute's brand of a world class research facility focused on eradicating infectious diseases.

"Scientists predict by 2050 infectious diseases will be the number one global killer surpassing heart disease, hypertension and cancer," said

Dr. Larry Schlesinger, Professor, President and CEO of Texas Biomed. "Our strategic plan sets the framework for us to be a leader in infectious disease research. Through our science and our business model, we have established a new approach to discovery that pushes the boundaries of getting treatments and vaccines from the petri dish to the patient.

Of the 13 new recruits joining Texas Biomed, three were welcomed in 2017, two in 2018, three in 2019 and five will join Texas Biomed in 2020. These recruitments not only extend the expertise of Texas Biomed's scientific staff but also add to the Institute's capabilities in veterinary medicine and business administration. As the Institute presses on with its strategic plan, senior leaders, faculty members and staff continue to look forward to greater opportunities and enhanced scientific discovery.

2017 RECRUITS



LARRY SCHLESINGER, M.D.

Professor, President & CEO

Dr. Schlesinger is an internationally recognized authority in infectious diseases with a particular interest in tuberculosis and lung biology. As a physician scientist, his studies focus on the pathogenesis of tuberculosis and other airborne infectious agents that subvert lung immune mechanisms.



JOANNE TURNER, Ph.D.

Professor and Vice President for Research

Dr. Turner ensures Texas Biomed scientists receive the support needed to conduct their science. She also has a lab within the Texas Biomed campus and focuses her research on tuberculosis, aging and inflammation.



JORDI TORRELLES, Ph.D.

Professor

Focused on the study of the human lung environment and its effect on the outcome of TB disease due to *Mycobacterium tuberculosis* (*M.tb*) infection, Dr. Torrelles' lab has developed a faster and cheaper TB diagnostic test, which is undergoing field testing in the Democratic Republic of the Congo. His team also has a patented TB vaccine candidate.

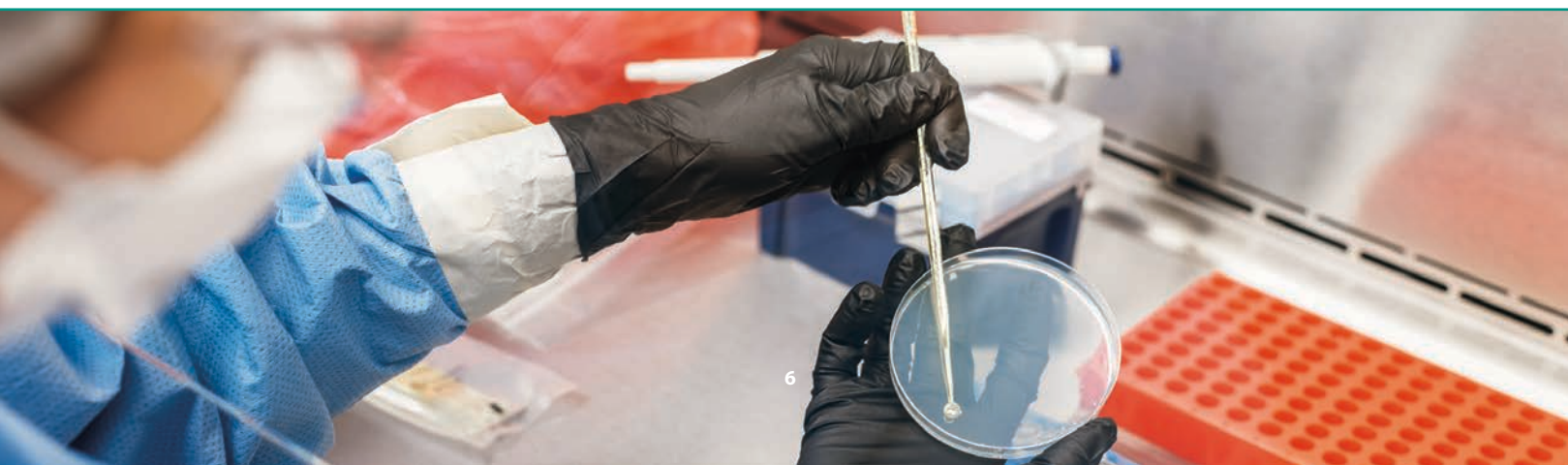
2018 RECRUITS



CORINNA ROSS, Ph.D.

Associate Professor

Dr. Ross' laboratory team is developing new phenotypic tools to assess marmoset health and behavior as a biomedical model of human disease. They are also developing new techniques to increase longevity in the marmoset. Improved health and longevity of marmosets is important for future studies of aging processes in nonhuman primate models for the purpose of improving human health.





DEEPAK KAUSHAL, Ph.D.

Professor and Director of SNPRC

As the Director of the Southwest National Primate Research Center, Dr. Kaushal oversees more than \$40 million NIH-funded national resources for primate research center. Dr. Kaushal also maintains his own lab focused on studying tuberculosis in nonhuman primate models.

2019 RECRUITS



ANNA GOODROE, D.V.M., DACLAM

Assistant Professor, Veterinarian

Dr. Goodroe has her doctorate in Veterinary Medicine from Texas A&M University. She's particularly fond of working with marmosets, small New World monkeys from South America used for research in areas from Alzheimer's to Zika.



DIAKO EBRAHIMI, Ph.D.

Assistant Professor

Dr. Ebrahimi has more than a decade of experience working in quantitative biology and genomics. His lab combines data and expertise across multiple quantitative and experimental science disciplines such as genetics, virology, cancer, evolution, bioinformatics, mathematics, and statistics to develop and test novel hypotheses.



MAHESH MOHAN, Ph.D.

Professor

The focus of Dr. Mohan's laboratory is to investigate epigenetic mechanisms, in particular, the role of microRNAs (miRNAs) and DNA methylation in the molecular pathogenesis of HIV/SIV infection.

2020 RECRUITS



LUIS MARTINEZ-SOBRIDO, Ph.D.

Professor

Dr. Martinez-Sobrido is widely recognized for his expertise in generating recombinant viruses, specifically influenza, arenaviruses, and Zika virus, using plasmid-based reverse genetic approaches. His lab aims to develop vaccines and antivirals that can be long-lasting for viral infections in humans.



CORY HALLAM, Ph.D.

Vice President of Business Development and Strategic Partnerships, Professor

Dr. Hallam was the force behind the Center for Innovation Technology and Entrepreneurship at the University of Texas at San Antonio (UTSA), serving as its founding director. He was also UTSA's chief commercialization officer and an associate professor for the Jacobson Distinguished Professorship of Innovation and Entrepreneurship.



DIANA SCORPIO, D.V.M., MPH, DACLAM

Professor, Associate Director of Veterinary Resources and Research Support, and Attending Veterinarian

Dr. Scorpio is a licensed veterinarian and has been a Diplomate of the American College of Laboratory Animal Medicine since 2004. She was, most recently, the Chief Senior Scientist at the National Institutes of Health.



BINHUA (JULIE) LING, Ph.D.

Associate Professor

Dr. Ling's lab focuses on the investigation of persistent HIV tissue reservoirs and development of prophylactic and therapeutic strategies for prevention and cure of HIV-1 infection in humans using a model of simian immunodeficiency virus or simian-human immunodeficiency virus (SIV/SHIV) infection in nonhuman primates (NHP).



VINAY SHIVANNA, Ph.D., D.V.M., DACVM

Assistant Professor and Veterinary Pathologist

Dr. Shivanna comes from Kansas State University, where he served as an anatomic pathology resident. He is a member of the American College of Veterinary Microbiology and brings with him skills and expertise in virology, molecular biology, molecular pathology and host-pathogen interactions, as well as experience in high containment research.

Biomedical research is moving at a faster pace and has been called “hypercompetitive” by the National Institutes of Health (NIH). Today’s research environment emphasizes the need for effective teams of scientists bringing distinct but complementary approaches to solving big problems, which is exactly how Texas Biomed has approached this time of historical growth and positioned the Institute to respond to the unprecedented challenges the world would face in 2020 in a global race to find a cure and vaccines for the COVID-19 pandemic.

Texas Biomed is a successful, private non-profit research institute who has partnered with hundreds of researchers and institutions around the world, targeting advances in the fight against infectious diseases, as well as infectious disease susceptible populations with comorbidities such as aging, diabetes, obesity, and more. Texas Biomed is driven by a daring vision to revolutionize bioscience to drive faster, cheaper, more effective health care innovations to market, specifically in infectious disease care.

Discoveries in 2019 helped pave the way for Texas Biomed to grow its capabilities and further solidify its foundation as a critical component for pre-clinical studies that move medicines and technologies to market.

NEW BSL-3 LABORATORY EXPANDS TEXAS BIOMED’S RESEARCH ARSENAL

Texas Biomed completed the construction of a new state-of-the-art biosafety level 3 (BSL-3) laboratory and opened its doors to begin research. Dr. Schlesinger said Texas Biomed’s laboratory expansions were crucial to meet the growing

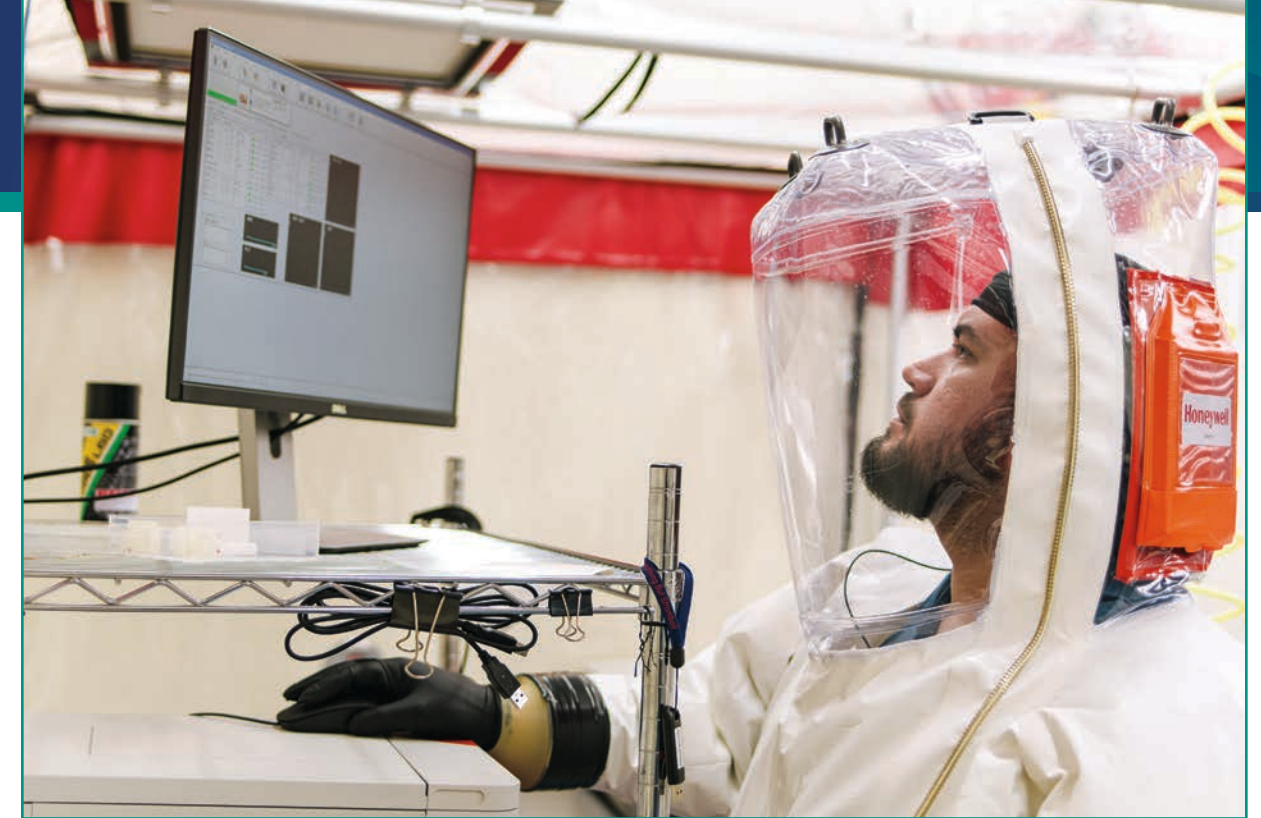
demands for discovering more effective diagnostics, therapies and vaccines for infections. The new BSL-3, along with renovations to the BSL-4 and new marmoset facilities that also came online in 2019, have contributed significantly to Texas Biomed’s ability to play an important role in the 2020 COVID-19 pandemic.

OPTOFLUIDIC CHIPS TO DETECT ZIKA VIRUS

The Zika virus, which is caused by the bite from an infected mosquito, has been infecting humans for 70 years. There’s no vaccine for the virus, and pregnant women suffer the worst of symptoms. The virus is known to cause deformities in fetuses and often leads to stillbirths and miscarriages. Texas Biomed has been leading efforts in Zika virus research, as Professor Jean Patterson, Ph.D. has been studying the virus since 2017. Dr. Patterson, along with collaborators from the University of California at Santa Cruz, Brigham Young University and the University of California at Berkeley, developed a new technology using optofluidic chips to screen bodily fluids (blood, urine, semen) for the presence of the virus and determine its stage. Knowing the stage of the virus using this new diagnostic tool may help clinicians treat patients before the virus replicates, causing further damage.

TEXAS BIOMED DEVELOPS QUICK AND AFFORDABLE TB DIAGNOSTIC

The world’s highest incidence of Tuberculosis, the disease caused by the virus *Mycobacterium tuberculosis*, and drug-resistant tuberculosis is within the Democratic Republic of the Congo (DRC). However, testing in the DRC is unparalleled to other countries affected by the disease. Alongside worldwide collaborators, Texas



Biomed researchers, led by Dr. Jordi Torrelles, Professor and Population Health Program Lead, developed a faster and cheaper diagnostic to test for TB and implemented field testing in the DRC. This will allow patients affected with the disease to have easy access to testing. Researchers continue to collect data from the field tests and hope their efforts will lead to bigger healthcare changes in the DRC such as access to affordable medication.

DIABETES MEDICATION USED TO REVERSE AGING

The use of diabetic medications to turn back the clock on aging made headlines. A collaborative study with the Southwest National Primate Research Center (SNPRC), UT Health San Antonio, South Texas Veterans Health Care System and Texas A&M San Antonio showed Metformin and Acarbose had no adverse side effects when given to Marmoset monkeys, which have aging patterns similar to humans. The theory behind these medications’ possible age-related benefits is that their activity mimics calorie restriction, an intervention shown to increase

longevity and healthspan in mice. The scientists are working to receive federal funding for a long-term research project focusing on the effectiveness of the medications.

NEW PARTNERSHIP WITH LONGTIME COLLABORATORS

Founded by UT Health San Antonio, Texas Biomedical Research Institute (Texas Biomed), The University of Texas at San Antonio (UTSA) and Southwest Research Institute (SwRI®), the San Antonio Partnership for Precision Therapeutics (SAPPT) is a new San Antonio partnership created to address the specific and diverse medical needs of the city’s population while serving as a model for the development of therapies to improve medical treatment around the world. It includes collaborative research project teams, overseen by a leadership council and external advisory board, as well as a technical steering committee composed of senior technical leads from all four institutions and pharmaceutical and industry experts who guide the selection of projects and commercialization opportunities. Learn more about this unique new organization on page 14.

OPTIMIZING VACCINE DEVELOPMENT TIMELINES: THE TEXAS BIOMED DIFFERENCE



THE RIGHT RESOURCES:

The functionality of highly integrated BSL-3/BSL-4 laboratory capacity, multiple nonhuman primate (NHP) species co-located on campus, and scientific and animal care staff highly experienced at pre-clinical science is unmatched.



OPERATIONAL AGILITY:

Highly networked with sponsors, donors, and the NIH, we coordinate agreements, navigate complex regulatory and compliance processes, and initiate studies faster than traditional commercial or academic R&D organizations.

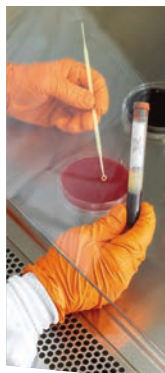


LASER FOCUS ON EVIDENCE-BASED SCIENCE, SAFETY, AND EFFICACY:

With a secure facility, more than 50 years of infectious disease experience, and the credentials and grit that FDA review and approvals demand, we move quickly and unencumbered through clinical trial phases without sacrificing evidence-based science, the safety of patients, or efficacy of therapeutics.

STEP 1

Basic Discovery Research



- **Understand the virus:** Virologists study the virus through a variety of methods — from genomics to biology.
- **Understand the immune response:** Immunologists look at how our bodies respond to a virus by searching for immune response drivers.
- **Determine whether the immune response is protective:** Researchers perform in vitro (cell culture) and in vivo (animal model) studies to test whether antibodies produced protect the immune system and block virus replication.

Texas Biomed has a team of more than 75 PhD scientists focused on infectious disease research and the intersection of infection and chronic diseases, such as diabetes, heart disease and even aging. This focus enables Texas Biomed to speed the rate of discovery and contribute to greater scientific understanding of the interactions between microbes and humans. This research is the foundation for the medicines we take and the technologies that save human lives.

STEP 2

Pre-clinical Development



PART 1: ANIMAL MODEL DEVELOPMENT

- Why animal models?
 - Only humans and other primates are susceptible to many of the infectious diseases that threaten human populations.
 - Nonhuman primate models allow investigation of physiological characteristics shared only by humans and other primates.

Texas Biomed addresses research questions using cell cultures, tissue studies and computer models, but research with animals is critical for the advancement of human health.

Complex disease processes involve multiple physiological processes and organ systems and require the use of complex models.

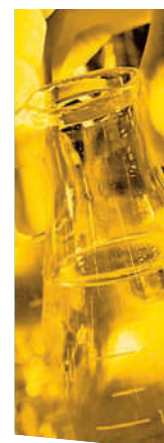
PART 2: VACCINE DEVELOPMENT

- Scientists take components of the virus that provide protective immune response and assemble them together, usually one of two ways: 1) using the whole virus (if it is killed to make it noninfectious) or 2) using proteins, RNA or DNA of the virus to make it recognizable.
- They then may incorporate adjuvants to see which drive the best immune response. Typically, only a few work in humans, so those are tested first.
- The vaccine is then designed and screened through a small animal (like rodents, guinea pigs, ferrets, or rabbits) to determine effectiveness. This is usually conducted several times using control animals to ensure the data is repeated and accurate.
- Studies then progress to larger animal models like nonhuman primates to test safety and efficacy ahead of human clinical trials.

STEP 2

(continued)

Pre-clinical Development



PART 3: FDA SUBMISSION REQUIREMENTS TO MOVE TO HUMAN CLINICAL TRIALS

- Drug developers, or sponsors, must submit an Investigational New Drug (IND) application to FDA before beginning clinical research. In the IND application, developers must include:
 - Animal study data and toxicity (side effects that cause great harm) data
 - Manufacturing information
 - Clinical protocols (study plans) for studies to be conducted
 - Data from any prior human research
 - Information about the investigator

Texas Biomed is home to the Southwest National Primate Research Center, one of seven national centers in the U.S. dedicated to research with nonhuman primates (monkeys). Texas Biomed is also home to rodent and other animal species research and is the only place in the world to combine these animal research resources with the highest biosafety containment labs and regulated study procedures, which enable the Institute to move through pre-clinical development seamlessly and comprehensively, so as to move therapeutics and vaccines through this part of the pipeline faster.

- These plans must adhere strictly to quality control and assurance standards, and provide proof of scientific validity and reproducibility.
- The FDA team requires a 30-day timespan for review in an effort to keep volunteers safe and avoid significant risk.

STEP 3

Clinical Development



PART 1: CLINICAL TRIALS

Over the course of several years, thousands of human patients must be tested before the FDA will grant national approval for a commercialized pharmaceutical product, based on the following phases:

- **Phase 1:** 20-119 volunteers with no underlying health conditions are tested to find the best dose of a new drug with the fewest side effects. This phase is largely focused on safety for use.
- **Phase 2:** 100-500 volunteers with the disease or condition being studied are tested to determine the drug's effectiveness and to outline the common short-term adverse effects and risks associated with the drug.

- **Phase 3:** 1000-5000 volunteers with the disease or condition being studied are tested to evaluate how the new medication works in comparison to existing medications for the same condition. Trials in this phase can last for several years.

PART 2: FDA APPROVAL PROCESS

The FDA's drug approval process includes:

- Analysis of the target condition and available treatments
- Assessment of benefits and risks from clinical data
- Strategies for managing risks
- Approvals can be expedited for serious and life-threatening conditions; however, approvals generally take between 6 and 10 months

STEP 4

Commercial Phase



Before commercialization of a vaccine can begin, the FDA requires:

- FDA approval of the drug for commercialization based upon pre-clinical and clinical study data
- Production of label and description

- Regulatory review & approval, including fair market pricing
- Submission of a Biologics License Application (BLA), a request to introduce or deliver a biologic product into interstate commerce, which takes 6-10 months for approval

From there, companies may commercially market their release of the vaccine.

STEP 5

Manufacturing Scale-up

The fastest a vaccine has ever been made is 5 years, and the manufacturing process typically takes between 6 and 36 months. The process includes propagation of virus in bulk, purification, clarification, formulation (adding safe stabilizers and preservatives), and quality control through several hundred test processes.

STEP 6

Distribution to Providers & Patients

Once large-scale manufacturing is established, the vaccines can then be packaged, batch released, transported and distributed/shipped to healthcare providers.

5-15 YEARS

5-15 YEARS

2-5 YEARS

1-2 YEARS

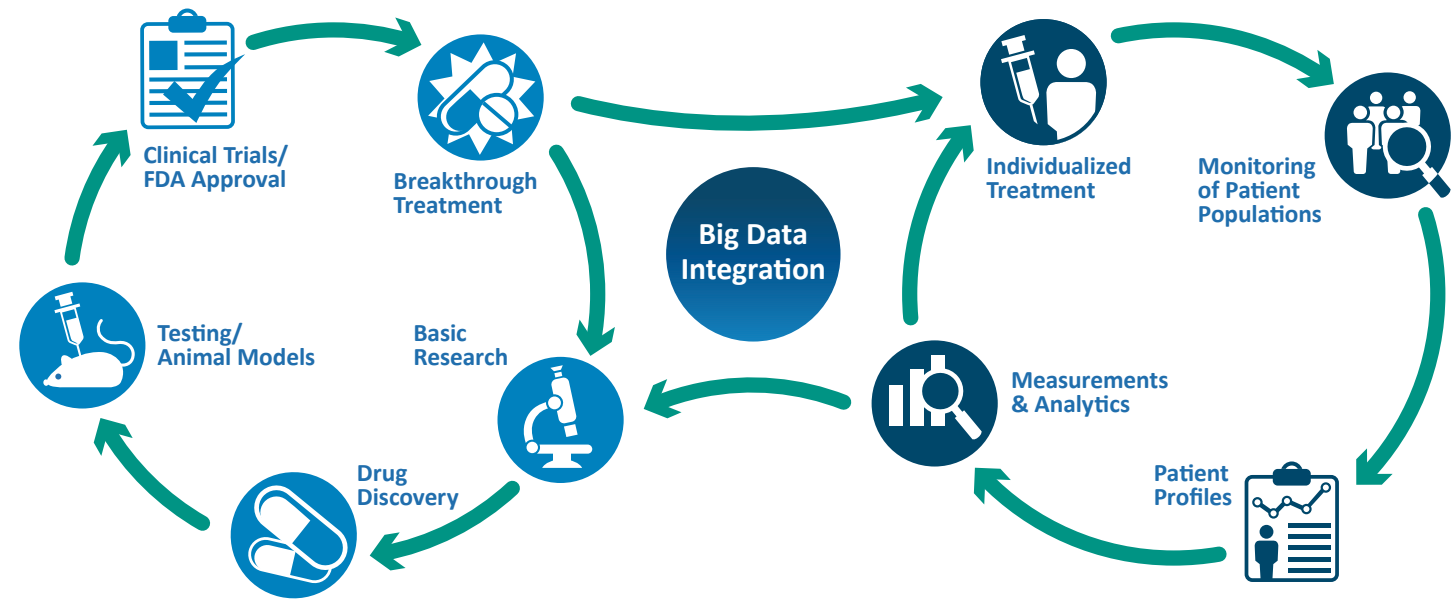
The entrepreneurial spirit continues to grow in San Antonio and has a strong foothold in the city’s bioscience sector. What the city lacks in size for this industry, it is making up for in collaboration — an asset so unique that cities nationwide are trying to emulate, as evidenced by a 2019 visit from the Indianapolis Chamber of Commerce that included several roundtables and workshops focused on San Antonio’s united bioscience culture.

“When I came to San Antonio in 2017, I quickly realized the distinctiveness of this community and the opportunity to build something extraordinary with the community’s spirit of collaboration,” said Dr. Larry Schlesinger, President/CEO of Texas Biomed. “The prospect of a small, independent research institution combining forces with undergraduate, graduate and independent research entities in the city is San Antonio’s competitive advantage.”

Over a glass of wine and good conversation, the presidents of Southwest Research Institute (Adam Hamilton), Texas Biomed (Larry Schlesinger), UT

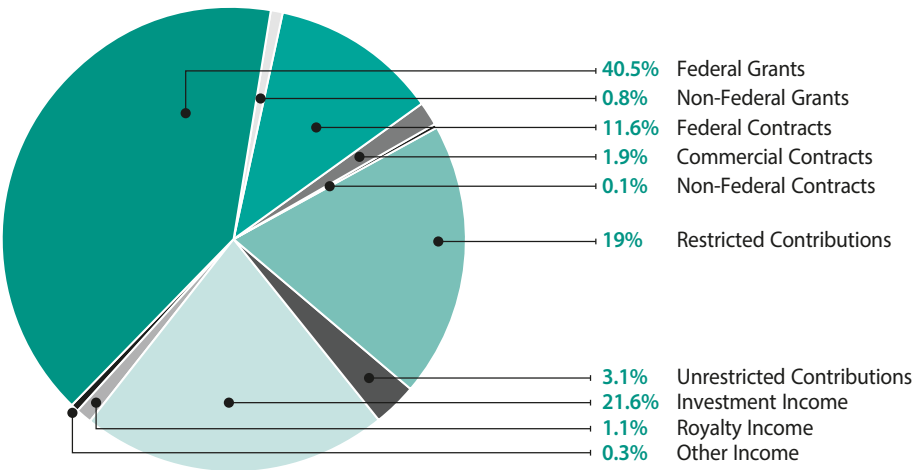
Health San Antonio (William Henrich) and the University of Texas at San Antonio (Taylor Eighmy) decided that the collaborations already in existence, such as the Vaccine Development Center of San Antonio, were a great starting point for a bigger effort that would solidify San Antonio as a place where science is thriving. What San Antonio needed was an organization to advance high-impact biomedical research in such a way that improved the health of San Antonio’s diverse population and served as a model for how science could move forward faster — enter the San Antonio Partnership for Precision Therapeutics (SAPPT).

“Precision therapeutics allows us to tailor our treatments from person to person, adapting for a patient’s lifestyle, environment and biology, within and across patient populations,” said Texas Biomed President and CEO Larry Schlesinger, M.D. “What is most exciting is that this program will completely integrate the approach of precision medicine with the discovery of new treatments as well as the reformulation of existing drugs and drug combinations to address the growing drug resistance problem. It’s a



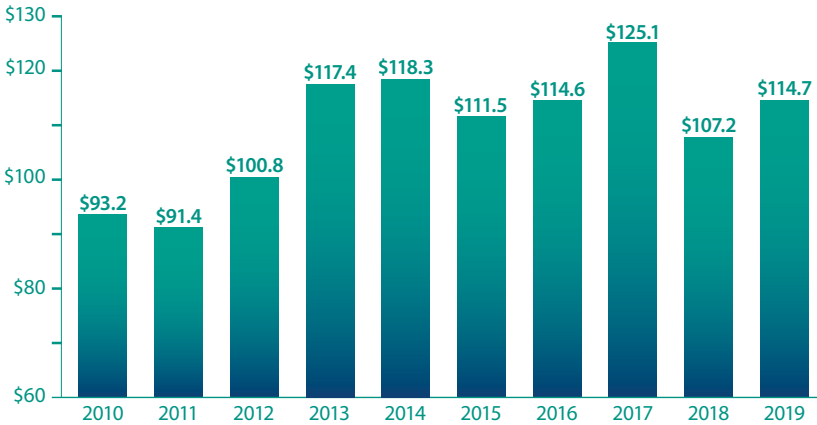
2019 REVENUE

BASED ON 2019 AUDITED REPORT



2019 VALUE OF ENDOWMENT

IN MILLIONS OF DOLLARS



game-changing approach to health care that will allow us to more quickly get therapies to market and work for the majority of those who need it most.”

The goals of SAPPT are to improve medicine by delivering therapies faster, with shorter recovery times and life-saving options tailored to individual populations rather than the masses. The work of SAPPT is being developed on the foundation of a \$40 billion bioscience industry in addition to military medical research that will provide a collaborative opportunity unique to San Antonio.

Funded with startup monies from each of the four institutions, SAPPT has established a scientific advisory board and already funded several projects

through 2020. Additional support will help sustain the organization as it grows, as evidenced by donations in 2020 from USAA, the San Antonio Area Foundation, the Vaccine Development Center and organizational support from the San Antonio Economic Development Foundation.

Liz Tullis, SAPPT Director, added, “Our community is diverse and can serve as a microcosm of the nation. This collaboration is a way to integrate what is learned at the bedside with what is learned in the lab to create more precise therapies for a wider range of populations. Ultimately, through SAPPT, San Antonio has the opportunity to create a world-class research hub for individualized health care.”

RESEARCH GRANTS & CONTRACTS AWARDED IN 2019

FEDERAL RESEARCH GRANTS	SPONSOR AND TITLE	PRINCIPAL INVESTIGATOR	LENGTH	PROJECT TOTAL
	NATIONAL INSTITUTES OF HEALTH (NIH) – Establishment of a SPF Rhesus Macaque Colony	Dr. Deepak Kaushal	4 years	\$9,299,924
	NIH – Cold Chain-Independent, Needle-Free Mucosal Virosomal Vaccine to Prevent HIV-1 Acquisition at Mucosal Levels	Dr. Viraj Kulkarni	2 years	\$8,120,959
	NIH – SigH based attenuated, efficacious M.tb vaccines to protect against lethal TB	Dr. Deepak Kaushal	4 years	\$4,214,613
	NIH – Impact of concurrent HIV and latent TB therapies on Mtb-specific immune function	Dr. Deepak Kaushal	3 years	\$3,299,986
	NIH – Immune Correlates of Protection from TB	Dr. Deepak Kaushal	4 years	\$3,237,501
	NIH/UOHSC – Strong Heart Study Coordinating Center	Dr. Shelley Cole	6 years	\$3,097,542
	NIH – Macrophage nuclear receptors, metabolism and immune effectors during health and M. tuberculosis infection	Dr. Larry Schlesinger	4 years	\$2,856,798
	NIH/STONYBROOK U – Cannabinoid modulation of extracellular vesicle composition and function in HIV/SIV infection	Dr. Mahesh Mohan	5 years	\$2,315,013
	NIH/HMRI – A Neonatal Monkey Model of Tuberculosis Vaccination	Dr. Marie-Claire Gauduin	3 years	\$2,251,269
	NIH/BCH – Optimizing and preclinical development of a TB Multiple Antigen Presenting System (MAPS) vaccine	Dr. Deepak Kaushal	4 years	\$1,532,253
	CONGRESSIONALLY DIRECTED MEDICAL RESEARCH PROGRAM – Zika Virus Countermeasures: Preclinical Pregnancy Models to Assess Protective Efficacy Against Placental Damage and Fetal Demise	Dr. Jean Patterson	3 years	\$1,233,890
	NIH – Perturbation of antigen-specific T cell responses in latent TB/SIV co-infection	Dr. Deepak Kaushal	2 years	\$1,077,111
	NIH/TRINITY – Marmosets as a Model for Understanding Social, Neuroendocrine, and Vascular Contributions to Cognitive Aging	Dr. Corinna Ross	5 years	\$701,089
	NIH/UWASH – Role of Group 3 Innate Lymphoid cells (ILC3) in Tuberculosis	Dr. Deepak Kaushal	4 years	\$645,830
	NIH/TULANE – Impact of tuberculosis on the development and function of the immune system in SIV-infected infants	Dr. Deepak Kaushal	5 years	\$614,381
	NIH/WUSL – Role of inducible bronchus associated lymphoid tissue in latent Tuberculosis	Dr. Deepak Kaushal	2 years	\$561,462
	NIH/UCSC – Nanopore-based multi-target analysis of Zika virus infection	Dr. Jean Patterson	4 years	\$508,195
	NIH – Expansion of Marmoset Breeding Facilities to Meet Increasing Research Demands (SNPRC Supplement)	Dr. Larry Schlesinger	1 year	\$499,999
	NIH – Role of chronic immune activation reactivating latent tuberculosis infection during M. tuberculosis/SIV co-infection: implications for anti-retroviral and anti-TB therapies (SNPRC Supplement)	Dr. Larry Schlesinger	2 years	\$499,998
	NIH – Development of resources to assess ambulation and sensory systems for marmoset AD/dementia research (SNPRC Supplement)	Dr. Corinna Ross	1 year	\$423,597
	NIH/WUSL – Common immune correlates of risk of TB disease in animal models and humans	Dr. Deepak Kaushal	3 years	\$290,964
	NIH – Exploring the impact of inflamming on immune function during M. tb infection (Admin Supplement)	Dr. Joanne Turner	1 year	\$289,900
	NIH/EMORY – Role of Antigen Specific T Cell Responses in the Control of TB	Dr. Deepak Kaushal	3 years	\$287,231
	NIH/WUSOM – Population genomics and new tools for the endgame of onchocerciasis elimination in Africa	Dr. Timothy Anderson	5 years	\$254,786
	BIOMEDICAL ADVANCED RESEARCH AND DEVELOPMENT AUTHORITY/JANSSEN – ELISpot and ICS analysis of Non-Human Primate samples generated under Janssen (DS-REF-129289: Immunogenicity of SLA-LSQ adjuvant formulations in non-human primates)	Dr. Luis Giavedoni	1 year	\$223,697

SPONSOR AND TITLE	PRINCIPAL INVESTIGATOR	LENGTH	PROJECT TOTAL
NIH/IOWA – CD40 regulation of acute virus infection	Dr. Olena Shtanko	2 years	\$125,794
NIH – 37th Annual Symposium on Nonhuman Primate Models for AIDS	Dr. Luis Giavedoni	1 year	\$74,999
NIH/JANSSEN – Janssen Federal Work Orders – Giavedoni; EBOV Vaccine study 17 ELISPOT	Dr. Luis Giavedoni	1 year	\$67,971
DEFENSE THREAT REDUCTION AGENCY/SRI – Grow, Expand, and Extract Total RNA	Dr. Ricardo Carrion	1 year	\$62,192
NIH/EMORY – Development of Gleevec for TB and TB/HIV	Dr. Deepak Kaushal	2 years	\$59,005
NIH/UTHSCSA – Evaluation of the risk of TB reactivation in BCG vaccinated marmosets treated with IL-17 antagonist, Secukinumab	Dr. Deepak Kaushal	1 year	\$45,000
NIH/AIBS – Novel accurate therapy for Multiple Sclerosis: Optimization of antisense oligonucleotides delivery and functionality in primary T cells	Dr. Corinna Ross	2 years	\$23,162
NIH/UPMC – Regulatory immune cell therapy, promotion of tolerance and underlying mechanisms in NHP renal transplantation Luminex assay (29-plex)	Dr. Luis Giavedoni	1 year	\$9,526
NIH/UTMB – Screening EBOV ELISA assay for 30 cynomolgus samples from Covance for UTMB	Dr. Luis Giavedoni	1 year	\$7,470

Total from Federal Research: \$48,813,107

PHILANTHROPIC AND PRIVATE CONTRACTS AND GRANTS	SPONSOR AND TITLE	PRINCIPAL INVESTIGATOR	LENGTH	PROJECT TOTAL
	SAN ANTONIO MEDICAL FOUNDATION – Modified Mycobacterium bovis Calmette-Guerin vaccine to improve bladder cancer	Dr. Jordi Torrelles	1 year	\$173,354
	CIVILIAN RESEARCH AND DEVELOPMENT FOUNDATION GLOBAL – Immune and microbiome correlates of TB reactivation in PLHIV and a NHP model	Dr. Deepak Kaushal	3 years	\$120,000
	WILLIAM & ELLA OWENS MEDICAL RESEARCH FOUNDATION – Reversing age-related cognitive decline and memory deficits with mitochondria enhancers	Dr. Marcel Daadi	3 years	\$101,708
	OTTAWA HOSPITAL RESEARCH INSTITUTE – Umbilical Cord Stem Cell Therapy for Bronchopulmonary Dysplasia	Dr. Christopher Chen	1 year	\$81,993
	TEXAS BIOMEDICAL FORUM – Population-specific immune gene splicing and its role in antiviral immunity	Dr. Diako Ebrahimi	1 year	\$60,000
	TEXAS BIOMEDICAL FORUM – Linking receptor-mediated phagocytosis and cAMP pathways in macrophage responses to Tuberculosis	Dr. Chrissy Leopold Wager	1 year	\$60,000
	TEXAS BIOMEDICAL FORUM – CRISPR/Cas13d RNA editing system: A new scissor to clip HIV RNA	Dr. Viraj Kulkarni	1 year	\$60,000
	PhRMA FOUNDATION/PURDUE – Integrating in vitro and computational approaches to accelerate drug development for TB/HIV co-infection	Dr. Larry Schlesinger	2 years	\$27,735

Total from Philanthropic and Private Research: \$684,790

COMMERCIAL CONTRACTS

Total from Commercial Research: \$190,727

TOTAL OF NEW CONTRACTS AND GRANTS: \$49,688,624



Thank You.

Last year, Texas Biomed embarked on a Scientific Revolution Capital Campaign. This 10-year strategic plan is a bold pathway to defeat infectious disease supporting three initiatives: *people, programs, and places*. With appropriate recruitment of top tier scientists, support systems to ensure cutting-edge success, and innovative spaces, Texas Biomed is positioned to become a world leader in infectious disease research. This is made possible through the philanthropic support of donors committed to the mission and who share the vision of Texas Biomed.

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SCIENTIFIC DISCOVERY.

If you think about it, it’s nothing short of amazing that in 1970 – 50 years ago — Dottie Block, Tena Gorman and Ruth Eileen Sullivan had the vision and creativity to launch Southwest Research Forum, today known as Texas Biomedical Forum. How incredible is it that in our 50th year our mission is clearer than ever? There is nothing better than standing behind Texas Biomed at this moment in time.

The purpose of Texas Biomedical Forum continues to be to support the Texas Biomedical Research Institute through community relations, volunteer services and fundraising. Over the years, the Forum’s fundraising efforts have raised approximately \$3.2 million in pilot studies. These grants are sometimes known as “seed grants” because they are relatively small, but the ideas they power can grow to become huge in their impact. The funding has allowed researchers to apply for additional grant monies exceeding \$75 million in subsequent awards, which equates to approximately \$23 in return for every single dollar of forum grants. In commemorating our 50th year, we received three \$100,000 grant matches. We are incredibly grateful to the Gorman Family Foundation, the Mays Foundation and the Sullivan Family Foundation; the generosity of these three donor matches has allowed the Forum to give a little over \$400,000 to the scientist pilot studies this year alone.

We started our year with our Past President’s Luncheon. What an honor to be in the room with one of our Founders, Tena Gorman, as well as many founding board members and Past Presidents. This powerful group of women have each played a vital part in shaping this organization into what it is today. I am incredibly thankful for their continued support.

In November, we held our Fall Lecture Luncheon, one of our educational outreaches to the community. This series was on “Vaccinations: Myths and Misunderstandings” and the panel of speakers included Joanne Turner, Ph.D., Texas Biomed’s VP for Research and Cherise Rohr-Allegrini, President of the San Antonio Vaccine Development Center. Later in the month at our Margaritas, Mariachis & Members’ Social, our Forum members had the opportunity to listen to Dr. Mahesh Mohan discuss the effect of cannabinoids on the inflammation caused by HIV and potentially other illnesses as well.

In February, the Forum hosted its 3rd and final Cheers for Chairity event. This event allowed some of the most talented designers in San Antonio and the surrounding area to redesign and put their creative twist on The Argyle’s historical dining chairs and patio furniture. This event was a huge success once again.

At the beginning of March, we held our Spring Lecture Luncheon, where three lecture panelists, Suzanne Dabbous, M.D. (Radiologist and Past Forum President), Jean Patterson, Ph.D. (Professor) and Angelica M. Olmo-Fontanez, M.S. (Graduate Student/ Biomedical Researcher) discussed the “Routes of Success: From Early to Established Careers Women Discuss Pathways in STEM”. At this event, we also recognized the winners of our 26th Annual Science Education Awards. We’re very grateful to Valerie Guenther for her ongoing support of the Forum and her continued leadership with the Science Education Awards — a program that allows us to recognize top high school science teachers. Congratulations to Dr. Jamie Holbrook (Saint Mary’s Hall), Jennifer Rice (John Marshall High School), and Susan Barber (New Braunfels High School), who received the accolades this year. Last, but certainly not least, the Charles Butt Foundation presented a check for \$50,000 to the Forum’s K-12 grant program. But the generosity didn’t stop there — the Foundation generously agreed to do so for three consecutive years.

Another science outreach program the Forum offers is student tours. Throughout the year, San Antonio and surrounding area high school science classes get the privilege of touring the Texas Biomed campus. This year we had local students as well as neighboring towns including Del Rio High School, New Braunfels High School and Saint Mary’s Hall, to name just a few.

FOR MORE INFORMATION ABOUT GIVING OPPORTUNITIES,
PLEASE VISIT OUR WEBSITE WWW.TXBIOMED.ORG AND CLICK ON **SUPPORT US.**

And then in the middle of March... an unexpected, and unwelcomed, pandemic: COVID-19. It goes without saying that we rapidly entered uncharted territory, confronted extraordinary and fast-moving circumstances, and faced some very tough decisions. On May 16th, our 50th Anniversary reception to honor the Forum's Founders and Past Presidents was the first to be cancelled.

Next, one of the most highly-anticipated social events of the year, held the first Saturday in May, our 50th Anniversary 2020 Forum Gala "The Starry Night" was cancelled. What has been made crystal clear in these uncertain times is the significance of the life-saving work and research carried out by Texas Biomed. With this in mind, we asked our table sponsors to consider allowing us to donate their sponsorship dollars intended for the 2020 gala directly to COVID-19 research. Through their generosity, we were able to give Texas Biomed close to \$330,000 for this research, which is so critically needed at this time.

As we close out this year with a gift of \$800,000 to Texas Biomed, I'm overwhelmed with gratitude. Thank you to the Forum's Board of Trustees and Advisors who worked so hard this year. Thank you to our Founders and Past Presidents for shaping us into what we are today and continuing to cheer us on along the way. Thank you to our members for supporting our cause. Thank you to our donors, who helped make this a record-breaking year. Most importantly, thank you to our leader Larry Schlesinger, M.D. and our scientists at Texas Biomed for making the world a better place one research project at a time — for making miraculous discoveries and saving countless lives along the way. I'm in awe of all of you and the part you played in this year's success. It has been a true honor to have served as the 50th President of Texas Biomedical Forum.

With Sincere Appreciation,



Amy Vogt Swaney
2019-2020 Forum President



Whitney Schones and Karen Bryant present a \$725,000 check from the 2020 Gala.



Amy Swaney presents Larry Schlesinger a check for \$800,000, including the Gala funds, to support COVID-19 research, education programs and pilot projects.

Each year, The Forum awards grants to scientists at Texas Biomed to assist in developing preliminary data that will enable these scientists to secure future funding for novel projects. The following projects were funded in 2019.

FACULTY

Assistant Professor Diako Ebrahimi, Ph.D.

Population-specific gene splicing and its role in antiviral immunity

STAFF SCIENTIST

Viraj Kulkarni, Ph.D.

CRISPR/Cas13d RNA editing system: A new scissor to clip HIV RNA

POST-DOCTORAL SCIENTISTS

Chrissy Leopold Wager, Ph.D. (works in Dr. Larry Schlesinger's lab)

Linking receptor-mediated phagocytosis and cAMP pathways in macrophage responses to tuberculosis

Egie Enabulele, Ph.D. (works in Dr. Tim Anderson's lab)

Exploiting museum rodent collections to understand zoonotic disease reservoirs

COWLES POST-DOCTORAL FELLOWSHIP

Juan Ignacio Garcia, Ph.D. (works in Dr. Jordi Torrelles' lab)

Determining the efficacy of a novel TB diagnostic test to monitor treatment success in drug resistant TB cases



THE FOUNDER'S
COUNCIL EXISTS TO
EDUCATE ITS MEMBERS
ABOUT THE
LIFE-CHANGING
RESEARCH CONDUCTED
EVERY DAY AT
TEXAS BIOMED.

greater San Antonio region who show potential for lifelong support of Texas Biomed. The Founder's Council has approximately 300 members from all business sectors whose annual contributions and sponsorships help fund essential equipment grants for scientists at Texas Biomed.

As President of the Founder's Council, I was honored to be an ex-officio member of the Texas Biomed Board of Trustees. In these board meetings, I had the opportunity to witness the leadership, vision, and confidence that this distinguished group brings to Texas Biomed. How lucky we are in San Antonio to have a man like Dr. Larry Schlesinger leading a group of incredibly talented scientists, whose ground-breaking research will have lasting global impact for generations to come.

In 2018, the Founder's Council Board of Directors voted in favor of distributing fewer yet higher-value grants than in previous years. In 2019, our Board voted to once again distribute high-value scientific equipment grants which are able to be used by numerous scientists and across various research projects, thus making a greater impact at Texas Biomed.

2019 was a record setting year for The Founder's Council as we were able to grant \$143,500 for scientific equipment to Texas Biomedical Research Institute — an all-time high!

The Founder's Council is a dynamic group of professionals and young leaders in San Antonio and are between the ages of 25 and 46. The Founder's Council was founded in 1988 to honor the memory of Tom Slick and to promote Texas Biomedical Research Institute.

The mission of the Founder's Council is to cultivate interest in Texas Biomed among young leaders in the

The Founder's Council delivered three Lecture Luncheons at The Argyle throughout the year at which Texas Biomed scientists Dr. Deepak Kaushal, Dr. Raul A. Bastarrachea and Dr. Winka Le Clec'h shared their trailblazing research with our members and prospective members. In March of last year, members enjoyed our premiere event, Dining and Discourse, where scientists joined a table of guests in an intimate setting for dinner at The Argyle, allowing for candid conversations around their areas of expertise.

We are especially appreciative of event sponsors who underwrote 100 percent of our event costs, which allowed the Founder's Council to contribute more substantially to our equipment grants. 2019 concluded with a Holiday Celebration and Grant Presentation at the home of Mr. and Mrs. Richard Azar and thanks to our membership and our generous sponsors and donors, I was honored to present Dr. Joanne Turner, Vice President for Research at Texas Biomed, with equipment grant awards totaling \$143,500.

This record year would not have been possible without the hard work of the incredible Board with whom I served, which included Aaron Asel, Michele Camp, Trey Dawson, Stephanie Dick, Burkley Fitzsimons, James Griffin, Andrew Hunt, Evan Ketabchi, Liz LaBarge, Trevor Lawton, Madison Marceau, Madison Mauze, Katie Reynolds, Robert Turnbull, Alexis Wiesenthal, and Clint Worth. I owe them an immense amount of gratitude for their dedication and service to Texas Biomed and Founder's Council.

The Founder's Council exists to educate its members about life-changing research conducted every day at Texas Biomed. It is our sincerest hope, that once informed, these community leaders will continue to financially support Texas Biomed so that it may continue its noble and necessary research. This year played a crucial role in helping Texas Biomed make a global impact, and we are honored to carry on this distinguished tradition.

I am eternally grateful for the trust placed in me to lead the Founder's Council as President in 2019, and I look forward to the continued impact this group will make for Texas Biomed into the future.

At the Service of Texas Biomed,



Callie Price, 2019 President, Founder's Council

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None could have imagined what 2020 would hold. The COVID-19 pandemic has changed lives and forced us to change how we conduct business. As more information becomes available each day, The Argyle strives to make sure that while we make adjustments to serve our members, their health and the health of our employees is of the utmost importance. We've followed all CDC, state and city guidelines to do our part in preventing the spread of COVID-19. Initially, we were only able to provide to-go services, but as regulations change, we are slowly reopening and hope that we'll soon be able to operate at full capacity.

Unfortunately, we've had to make difficult decisions due to the financial impact of this pandemic. Due to a combination of a reduction in work hours and having to furlough some of our staff members, we initiated a COVID-19 Employee Fund. The response we received for this fund was amazing, and we are very grateful for the support and initiative of our Argyle Board President, Mrs. Kathryn Mays Johnson, our entire Board and The Argyle membership that cares deeply about the wellbeing of our employees. With the contributions received, we are able to provide paid medical assistance to all employees furloughed for up to 6 months and financial assistance to all employees with reduced work hours for many months to come.

We've gotten creative with member engagement, hosting virtual wine tastings and wine dinners. We've decorated our facilities for special to-go menu pickups for holidays such as Easter, Fiesta and Memorial Day. The Argyle "At Your Service" delivery program was created so that members can send their families and friends delicious meals and beverages from The Argyle on special occasions.

THE PURPOSE OF THE
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INFECTIOUS DISEASES
AND HAS NEVER BEEN
CLEARER THAN NOW.

We hope that the virtual events and exciting decor help alleviate the stress of members being confined in their homes and away from loved ones. We are happy to be able to deliver a little bit of The Argyle to their homes and help them get through this pandemic.

Through all of this, construction has still been taking place on the Coates-Kelso Garden and we're very excited to announce that the long-awaited project is finally coming to completion. In addition to the Coates-Kelso Garden, we are very pleased to report that our new Employee Parking lot and Storage Facility are also coming

to completion. We are now able to accommodate 28 new parking places and will increase our storage capacity considerably.

The Coates-Kelso Garden will be open by mid-June 2020 and will be a great place for casual outdoor dining and entertainment. The entire area will accommodate over 75 covers between seating and standing. There will be televisions and great music for a more laid-back atmosphere at the club.

The purpose of The Argyle has always been to support Texas Biomedical Research Institute and the fight against infectious diseases and has never

been clearer than now. We are grateful for all the great work that the Institute is doing in the fight against the COVID-19 virus.

As we slowly begin opening up, we look forward to seeing everyone's smiling faces and look forward to serving you.

— **Michael Vlad**, Chief Operating Officer
for The Argyle

As opposed to the traditional year-in-review update, The Argyle has provided a more recent update related to the impact of COVID-19.



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Acknowledgments

Texas Biomed Assistant
Vice President for
Communications, Editor
Lisa Cruz

Public Relations Specialist, Writer
Ja’Nise Solitaire

Designer
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Images

Josh Hushkin, Photographer pgs. 1, 5, 11, 29

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TEXAS BIOMEDICAL
RESEARCH INSTITUTE

TEXAS BIOMEDICAL RESEARCH INSTITUTE

P.O. BOX 760549

SAN ANTONIO, TEXAS 78245

www.txbiomed.org

210.258.9400