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Building the Research Enterprise of 2028

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BUILDING *the* RESEARCH ENTERPRISE of 2028

This edition of *Jefferson Research* offers a tantalizing peek at the array of work done at Thomas Jefferson University: from how mitochondria communicate with nearby organelles, to the use of innovative textiles to reduce a building's energy consumption; from how "digital readiness" can improve health equity, to space travel's effects on the immune system.

It also serves as a lens on the exciting path that the our university's research community will pursue over the next five years, guided by our new strategic plan for the Jefferson Research Enterprise. The carefully calibrated plan draws on insights from faculty, students and staff across the institution. It is rooted in the University's overarching tripartite objective: Before decade's end, Jefferson will be recognized as a national research university distinguished by programmatic excellence, innovation and multidisciplinary, multi-sector partnerships. We will be seen as the model for professions-focused higher education. We will be a distinctive, robust global presence in research and education.

Our research strategy builds on our nearly 200-year legacy of pioneering achievements in education, scientific discovery and technical invention. Excellence, innovation and collaboration are woven through the four core elements of our strategic plan.

First, we will leverage the programmatic research themes we have developed over the past decade to create or expand a select number of centers of research excellence (CRE). Prioritized by their potential for scientific and social impact, the CREs will address fields ranging from Smart and Healthy Cities to Life Energetics to Small RNA Discovery to Fashion and Textile Futures — and will include continued expansion of research at our NCI-designated Sidney Kimmel Cancer Center—Jefferson Health, the Vickie & Jack Farber Institute for Neuroscience, and the Computational Medicine Center, as well as launch of a Center for Vaccines and Pandemic Preparedness and an Institute for Global Health Security.

At the same time, we will continue advancing the work of individual scholars and small teams as they create and apply knowledge across a broad range of subjects: from investment banking practices, to the psychological roots of conspiracy theories; from sustainable architecture to racism in news media; from dissemination of Africa-based scholarship to the roots of creativity, and to women as entrepreneurs. (You'll find examples of this exciting and impactful research in the pages of this magazine.)

Second, replicating the success of the Jefferson Institute for Bioprocessing, we will launch a series of education-based initiatives that have significant research and development components. Those initiatives will leverage the rich potential — and Jefferson's existing strengths — in areas such as Health Cybersecurity, Biocomputation Human Factors Engineering and Design Thinking.

Third, we will continue growing our clinical research program (which now has more than 1,300 active clinical trials), aiming to increase patient participation by 50 percent. Toward that goal, we will build programs to address the specific needs of Jefferson's communities through targeted trials addressing clinical challenges such as stroke, cardiac disease and diabetes. This initiative is just one facet of a cross-cutting commitment to expand population science research across the University—especially the kind of work that will enable us to understand and counter the roots of health disparities.

The new relationships we create with our local communities will be the cornerstone of the fourth core element of our research plan: expanded partnerships and collaborations. We will, for example, launch regional partnerships to access high-end technologies; and catalyze national consortia to pursue targeted, high-impact research challenges. Of course, we will also expand the research programs undertaken by our seven Jefferson global centers and Consortia and by investigator-driven collaborative studies in 23 countries. With our partners, we will continue to address challenges ranging from maternal and infant death in India to road traffic injuries in Rwanda; and pursue collaborations that open new horizons — such as our work with investigators in Israel on biomedical projects to be undertaken on the International Space Station, and our robotics and artificial intelligence research in Japan.

Over the past decade, building on our predecessors' achievements, we have fortified the foundation of a truly extraordinary research enterprise. That foundation includes a world-class faculty, state-of-the-art core facilities and an energetic culture of team science and interdisciplinary exchange. We have established strong seed- and bridge-funding mechanisms and garnered steadily increasing external support: since 2017, our research revenue from agencies, corporations and foundations has grown by more than 64 percent. The dynamic expansion of our discovery and scholarship is reflected in a quadrupling of our publications to over 4,000 this past year.

In reading this magazine, I think you will see why we are so proud of what we have accomplished, and so enthusiastic about the future of Jefferson's research enterprise. I firmly believe it will be a future of both profound discovery and truly beneficial impact for our community and our world. ■

Mark L. Tykocinski

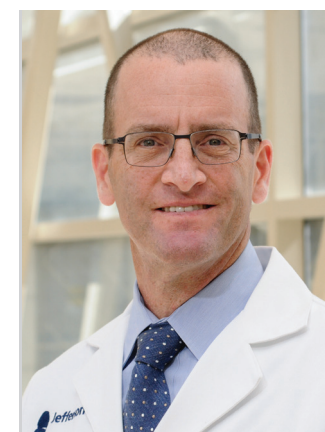
Mark L. Tykocinski, MD
Executive Vice President, Academic Affairs
Provost, Thomas Jefferson University
Anthony F. and Gertrude M. DePalma Dean
Sidney Kimmel Medical College



Programmatic Research

"Programmatic, basic and translational studies are the bedrock of scientific research at Jefferson, and we are continuing to build on our areas of great strength. These include nationally recognized programs in cancer mechanisms and immunotherapies, neurodevelopment and neurodegeneration, infectious diseases and vaccines, fibrotic disease and RNA biology. We will launch other initiatives in highly promising areas as well — and, working across disciplines and disease areas, we are committed to having real impact in reducing disparities in care and addressing the nonbiological causes of disease. To empower our investigators, we will continue making major investments in new research technologies — capitalizing, for example, on recent acquisitions of flow cytometry and cryo-EM systems, expanding our bioinformatics infrastructure, and making large-scale additions to the laboratories and core facilities available to our investigators." ■

Steven B. McMahon, Ph.D.
Senior Associate Provost for Programmatic Science



Clinical Research

"Clinical research brings the leading edge of our knowledge and scientific creativity directly to patients to improve medical care. Over the next five years, we will continue to empower our physicians and other investigators to advance new and better ways to promote health and detect, diagnose and treat disease. To that end, we will encourage substantially more faculty to engage in clinical research, in several ways: first, by expanding the successful "Clinical Research Boot Camp" for new clinician-scientists; second, by offering more Emerging Medical Science awards, which provide protected time for early career investigators; third, by increasing internal funding for pilot projects that translate faculty research into real interventions. We will also build infrastructure, such as the Jefferson Health Informatics Core, to help investigators organize and analyze electronic health records in ways that yield population-level insights and point the way to community-focused clinical research initiatives." ■

David Whellan, MD, MHS
Senior Associate Provost for Clinical Research
James C. Wilson Professor of Medicine



Applied Research

"At Jefferson, the term 'applied research' has broad application. It ranges from studies of soft materials and surface imaging to antitrust laws' effect on foreign investment. It includes academic-corporate partnerships where our industrial designers investigate and develop solutions for real people's challenges, and multidisciplinary projects with concrete impact—such as our initiative that bridges political science, economics, management, and materials science to help develop a sustainable and profitable hemp-based industry.

"In the next few years, we will expand our core capacities to do intellectually rigorous, impactful applied research by providing more bridge and project-completion grants to faculty, expanding dedicated research space on our East Falls campus, and increasing funding for graduate research and technical staff. With those resources, we will grow an array of already strong programs in areas such as business structure and supply chain modeling, product design and development, sustainability and building systems, and textile and materials technology." ■

Ronald Kander, PhD
Associate Provost for Applied Research