Inside Pennington

Pennington Biomedical Research Center











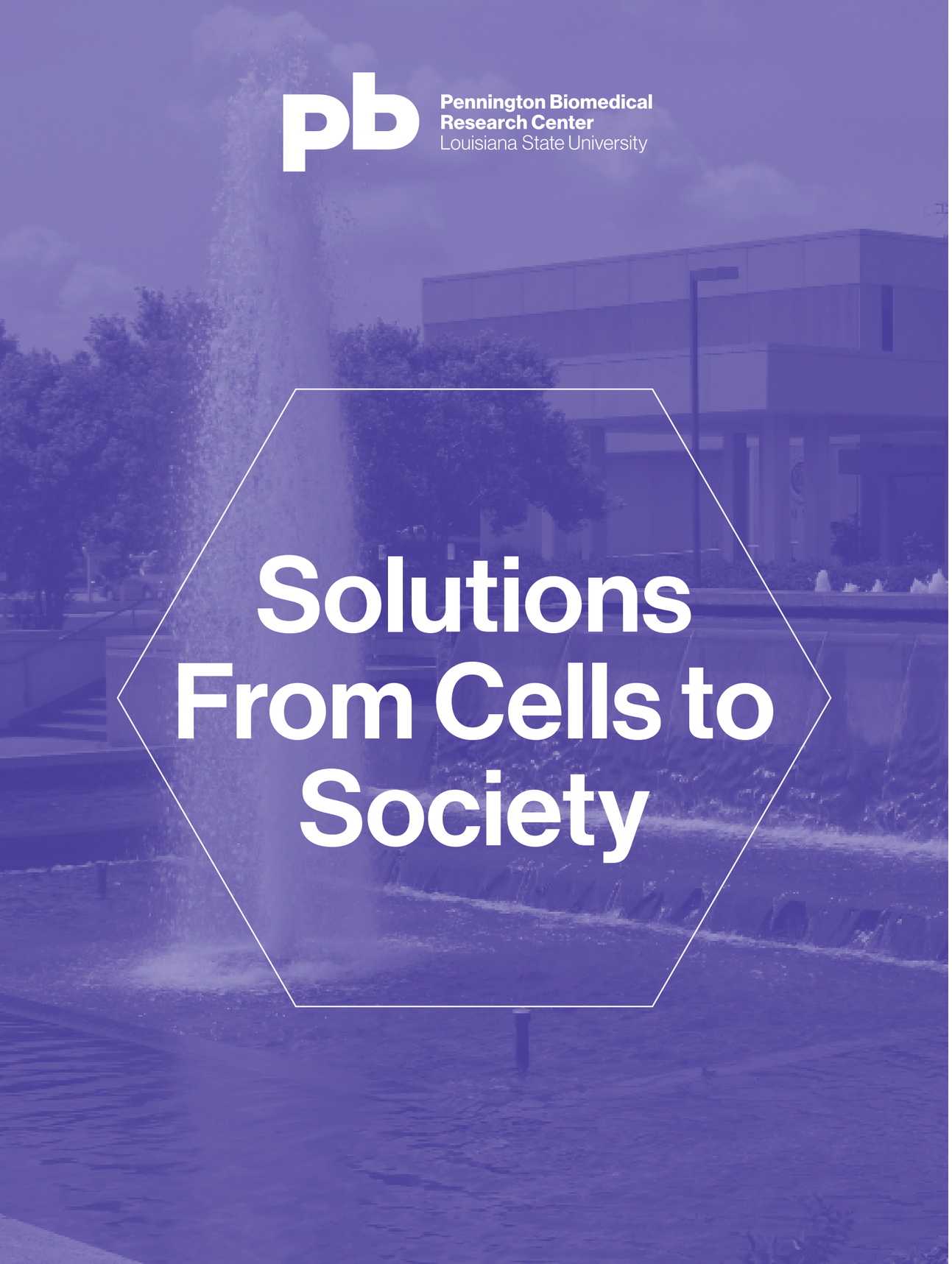

Pennington Biomedical Research Center
Louisiana State University

Solutions From Cells to Society

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A world-renowned research institution right here in Louisiana, the Pennington Biomedical Research Center is leading the world in promoting metabolic health and eliminating chronic diseases through scientific discoveries that create solutions from cells to society. Our mission is to discover the triggers of obesity and diet-related diseases and improve the health of all people through Research, Treatment & Prevention, Scientific Education, and Implementation & Outreach.

From the Executive Director

Pennington Biomedical is more than a center of scientific excellence for the state. It is a significant economic driver and a competitive asset for Louisiana and its Capital Region.

— John Kirwan, PhD, Executive Director

Pennington Biomedical Research Center is a public-private partnership that has become a global leader in nutrition research and metabolic health over the past three decades. Our vision is to lead the world in promoting metabolic health and eliminating metabolic diseases through scientific discoveries. Every day, our researchers are addressing health issues with innovative solutions from cells to society. We use "cells to society" to express the breadth and depth of Pennington Biomedical's work, describing the process whereby scientific discoveries made in the laboratory are translated into practical applications to benefit the broader population. As a state entity, we are proud to contribute to advancing scientific knowledge while helping Louisiana residents – and people across the world – live longer and healthier lives.

Pennington Biomedical has developed a long-standing reputation for excellence in metabolic research and leadership in clinical research. For more than 35 years, Pennington Biomedical has attracted talented researchers from across the globe to our Baton Rouge campus with the purpose of helping people live longer, healthier lives. These internationally renowned scientists collaborate with their colleagues, who represent more than 240 academic institutions across the state, the country and the world. The work of Pennington Biomedical's researchers has generated close to 400,000 citations in scientific literature, with five of our scientists ranking among the most cited researchers in the world.

The societal need for Pennington Biomedical's work has never been greater: obesity prevalence is at an all-time high, with more than 51 percent of the world's population projected to be overweight or have obesity by 2035, according to a report from the World Obesity Federation. At the same time, the field has never had more tools to fight this disease.

Lifestyle and behavioral programs developed at Pennington Biomedical have demonstrated efficacy and are being implemented. New medications are coming to market, most of which have been evaluated in clinical trials at Pennington Biomedical. Bariatric/metabolic surgery has proven to be a safe and highly efficacious treatment, and Pennington Biomedical has launched its own surgery program in partnership with Our Lady of the Lake Regional Medical Center and others. Our work in diabetes, cancer, Alzheimer's, dementia, aging, pediatrics, nutrition, and women's health has positioned the Center as a leader in discovering new treatments, cures, and prevention programs that can enhance health outcomes across the human lifespan.

Pennington Biomedical is more than a center of scientific excellence for the state. It is a significant economic driver and a competitive asset for Louisiana and its Capital Region. Our work combines the expertise of entrepreneurial researchers, who on average generate $813,000 annually in income from grants and contracts, with the more than 20 postdoctoral fellows, 13 highly specialized service facilities, and a network of 44 laboratories supported by lab technicians, nurses, dietitians and other personnel. Since the Center's founding, Pennington Biomedical has leveraged the state's contribution of $439 million to compete for and win more than $1.17 billion in federal grants, sponsored projects and philanthropic support – a 267 percent return on investment. In competing for federal fundings, Pennington Biomedical's National Institutes of Health funding rate is 55 percent higher than any other research center in the country.

With more than 35 years of successes and achievements, the Center has a long history of groundbreaking research, but with new discoveries and scientific insights on the horizon, the Center will have an even bigger impact on communities across Louisiana and beyond.

www.pbrc.edu/executive-director

Historical Timeline

1980 — C.B. "Doc" and Irene Pennington pledge $125 million to the LSU System.

1986 — Construction is completed on the first Pennington Biomedical facility, situated on a 222-acre tract of land.

1987 — The Pennington Biomedical Research Foundation is formed.

1989 — Pennington Biomedical signs a $3.5 million research agreement with the U.S. Army through its U.S. Military Nutrition Programs.

1990 — Pennington Biomedical receives campus designation.

1993 — NASA funds a study at Pennington Biomedical about the prevention of bone density and metabolism loss during prolonged orbit.

1995 — The Transgenic Laboratory is completed.

1997 — *The New England Journal of Medicine* publishes the results of the DASH (Dietary Approaches to Stop Hypertension) diet, showing the diet significantly lowers blood pressure.

2004 — The 187,000 square foot Basic Science Laboratory building opens.

2011 — Pennington Biomedical is awarded $9.9 million by the Louisiana Office of Group Benefits to study the health benefits of medical and surgical treatments for obesity.

2012 — The Louisiana Clinical and Translational Science Center is awarded by NIH, with Pennington Biomedical as the lead institution.

2014 — The Translational Research Clinic for Children opens to research and fight childhood obesity.

2018 — Pennington Biomedical celebrates 30 years of growth and discovery.

2020 — The Bariatric and Metabolic Institute, now Metamor Institute, opens on the Pennington Biomedical campus.

2021 — Pennington Biomedical launches Obecity, USA, a historic public service campaign to raise awareness of obesity as a disease.

2022 — Greaux Healthy, an evidence-based service initiative in artnership with the State of Louisiana, is developed.

2024 — Leading medical institutions in the Middle East and Pennington Biomedical begin exploring collaborations to address one of the most critical public health challenges facing the world today – obesity.

www.pbrc.edu/historical-timeline

Fast Facts

www.pbrc.edu/fast-facts

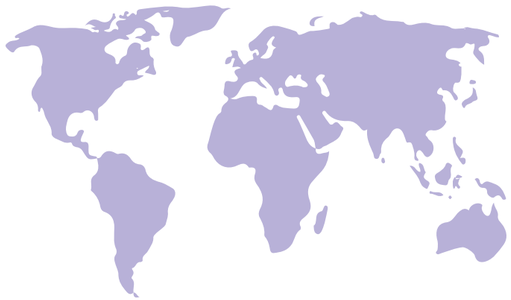
65,874
people have participated in a clinical trial screening visit

$215 million
Total value of current portfolio of active grants and contracts held by Pennington Biomedical researchers

7,879
total publications

250
worldwide collaborators

24
countries represented



44
labs supported by lab techs, nurses & dietitians

402,818
scientific literature citations

730,000
square feet of research space

79
patents issued

PENNINGTON BIOMEDICAL:

has a 35-year partnership with America's armed forces

is a leading provider of nutrition information to the U.S. military

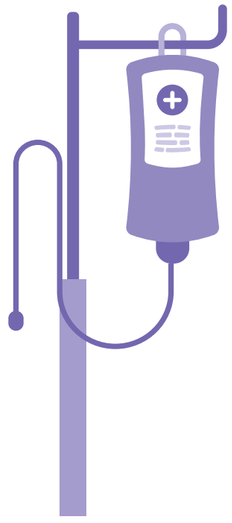
has been awarded over $100 million in funding for research to use our expertise to improve nutrition for soldiers in the field

5 faculty
rank among the world's most cited researchers

PB researchers have contributed to and tested **every weight loss and many diabetes medications on the market today**

First of its kind in the nation

to introduce a collaborative, centralized approach to weight loss with obesity medicine, lifestyle interventions, and surgery under one roof with the Metamor Institute



The Building Blocks of Pennington Biomedical:

US News & World Report ranked

DASH diet as best heart-healthy diet and best diabetes diet

American Heart Association

ranked DASH diet as the association's top heart-healthy eating style

Basic Science

Our Basic Science researchers are explorers in search of discovery. Each day, we are dedicated to research aimed at proving – and improving – the scientific theories that help us understand and predict phenomena that advance fundamental knowledge about human health.

Basic Science is foundational research, where our scientists are explorers in search of discovery, dedicated to uncovering the fundamental mechanisms that influence human health. Our basic scientists seek to understand how the body works, as well as what we can do to reverse or cure diseases burdening humanity.

Pennington Biomedical is internationally recognized for our state-of-the-art basic research in areas related to obesity, diabetes, metabolism, and chronic disease. These diseases exert a heavy toll on Louisiana and the world, and finding solutions to these critical issues is the principal goal of our basic scientists.

Scientific progress is dependent on the ability of basic scientists to make the fundamental discoveries that drive progress. Almost every modern cure and treatment started within a basic science lab, and our scientists are focused on making the next generation of discoveries that will lead to the eradication of the obesity epidemic, reduce the burden of metabolic disease, and improve human health.

Basic Science is comprised of researchers with diverging expertise including biochemistry, molecular biology, genomics, neurobiology, and metabolism, among others. Our scientists and research staff have made significant discoveries that are related to understanding physiology and neurobiology, as it relates to human metabolic diseases.

For example, Pennington Biomedical is recognized around the globe for our state-of-the-art research in characterizing animal models with modern diseases that are epidemics in Louisiana and beyond, such as obesity and type 2 diabetes.

Achievements Yielding Results

Regulating blood glucose levels: Our physiologists have discovered new ways of studying the communications among certain types of brain cells, astrocytes, and neurons. This live-cell imaging technique has allowed our basic scientists to determine that astrocyte glucose detectors and their communication with neurons are important factors in determining how the body regulates blood glucose levels. This discovery may lead to new ways of thinking about how the brain monitors the nutrient levels in our bodies which may influence our desire for food, and thus our feeding behavior – from overeating and under eating to cravings for certain food types.

Optogenetics: This novel technique was introduced to Louisiana by our researchers. This innovative methodology issued to stimulate specific kinds of neurons in live animals with precise light pulses through optical microfibers placed in the brains of transgenetic animal models. These novel methods allow our researchers to identify selective neuron populations in the brain associated with metabolism, hunger/satiety, and control of pleasure.

Skeletal Muscle: Muscle mass can decrease with aging. Further, with age and obesity, muscle loses its ability to respond to insulin by taking up glucose from the blood. This is a principal cause of type 2 diabetes. Our investigators are studying the fundamentals of muscle metabolism to understand how aging and chronic inflammation can be reversed to prevent the development of diabetes.

Maternal Diabetes: Our work has revealed the process by which maternal diabetes can cause devastating spinal cord defects such as spina bifida in the developing fetus. This work has been recognized as fundamental to a deeper understanding of such birth defects across the biomedical science field.

Obesity Treatment Options: Our researchers are tackling one of the most perplexing aspects of gastric bypass surgery for the correction of obesity – the rapid elimination of diabetes that is a hallmark of obesity. Using several microsurgical gastric bypass procedures in animal models, our investigators have found that the radical changes in food intake patterns generated by surgery are responsible for most of the effects that eliminate diabetes.

BAM15: A recently discovered chemical compound helped elderly animal models with obesity lose weight, add muscle and strength, reduce age-related inflammation and increase physical activity, providing the first evidence that BAM15, a mitochondrial uncoupler, prevents sarcopenic obesity, or age-related muscle loss accompanied by an increase in fat tissue. Pennington Biomedical researchers also found that life span may be increased by making cells less efficient at producing energy by using BAM15.

Cancer Precision Medicine: Our researchers are investigating neurofibromatosis (NF1), a genetic condition that leads to benign and malignant tumors related to leukemia, glioblastoma and breast cancer, with studies demonstrating the benefits of precision medicine. Studies examining molecular mechanisms associated with NF1 are addressing our overall hypothesis that mutation guided therapy will slow or reverse tumor growth in animals that harbor recapitulated NF1 mutations.

Nearly all of our modern cures and treatments had their start within a Basic Science lab, and our scientists are focused on making the next generation of discoveries that will lead to the eradication of obesity, reduce the burden of metabolic disease, and improve human health.

-Chris Morrison, PhD, Associate Executive Director for Basic Science

www.pbrc.edu/basic

Grant Funding:

- 16 awards totaling $5.3M in 2023-24
- $32.2M in active grant funding

Clinical Science

Clinical research is vital to Pennington Biomedical's mission, and it is at the center of translational biomedical research that is advancing discoveries from the bench to bedside. In collaboration with basic scientists, our clinical scientists design and implement novel studies that inform advances on the mechanisms, prevention, diagnosis and treatment strategies for individuals of all ages affected by disease.

Our clinical researchers are dedicated to improving the health of everyone affected by chronic diseases, leading to better physical and cognitive functionality from infants to senior citizens. Over the past three-plus decades, Clinical Science at Pennington Biomedical has conducted more than 200 randomized trials in the field of obesity and type 2 diabetes alone.

Since 1992, Pennington Biomedical has screened more than 65,000 citizens from Louisiana and beyond into research studies. Their participation is driving results that help researchers discover the triggers of chronic diseases that cause suffering across the lifespan resulting in skyrocketing health care costs.

Today, Pennington Biomedical is widely recognized for the development of landmark studies proving that key lifestyle changes – if maintained – can lead to successful outcomes for weight loss and health benefits.

Achievements Yielding Results

The DASH (Dietary Approaches to Stop Hypertension) Diet: Ranked as one of the top diets in America by US News & World Report and as the top heart-healthy eating style by the American Heart Association, the DASH diet, developed in part by Pennington Biomedical, is scientifically proven to improve health. The diet is a trustworthy tool for weight management and is an easy eating plan that the whole family can follow.

Medications: Pennington Biomedical has been involved in the development of all approved obesity medications on the market today, as well as many key diabetes medications. Pennington Biomedical was involved in trials that led to the approval of Semaglutide, the GLP-1 agonist that has been approved for obesity and can result in weight loss of up to 15 percent. Our researchers also participated in the eight-year-long GRADE study on commonly used type 2 diabetes medications, which showed differences in medication acceptance, quality of life, insulin secretion and mortality.

The Diabetes Prevention Program (DPP): Advocating for intensive lifestyle changes (developed in part at Pennington Biomedical), the DPP is an intervention program proven to reduce the incidence of diabetes by more than 55 percent. It is also considered one of the best-known strategies for weight management.

Healthy Aging: The Institute for Dementia Research and Prevention is an Alzheimer's Disease Cooperative Study Site, which is an innovative partnership with the National Institutes of Health's National Institute on Aging. This prestigious designation makes ours the only such site in a tri-state area, and it makes Pennington Biomedical home to one of the largest brain aging studies in the country, with more than 2,000 Louisiana participants helping identify triggers and advance treatments for dementia.

Bariatric Surgery Benefits: Remission of type 2 diabetes is achieved more effectively and has longer-lasting results with bariatric surgery than with medications and lifestyle changes, based on the largest study to date to evaluate metabolic surgery, also known as bariatric surgery, as a treatment for type 2 diabetes.

Molecular Mapping: Pennington Biomedical is part of the Molecular Transducers of Physical Activity Consortium, or MoTrPAC, a national research consortium designed to discover and perform preliminary characterization of the range of molecular transducers (the "molecular map") that underlie the effects of physical activity in humans. The program's goal is to study the molecular changes that occur during and after exercise and ultimately to advance the understanding of how physical activity improves and preserves health.

Nutrition for Precision Health: Pennington Biomedical remains at the forefront of precision nutrition with the Center being selected as one of 14 sites nationwide to enroll participants in NIH's landmark initiative, Nutrition for Precision Health. The study is engaging 10,000 participants across the country to learn more about how our bodies respond differently to food.

Pioneers: Investigators at Pennington Biomedical pioneered the development of 2D and 3D optical imaging systems and devices for phenotyping individuals' body shape, adiposity, and health risks. Further, our researchers discovered that the unique combination of modern deep learning models, specified equipment and three-dimensional body scans has given a quantitative validation on medical imaging that was previously only qualitative.

www.pbrc.edu/clinical

Our clinical scientists design and implement novel studies that yield advances on the mechanisms, prevention, and diagnosis and treatment strategies for obesity, diabetes and other metabolic diseases.

- Juan Lertora, PhD, Interim Associate Executive Director for Clinical Science

Pennington Biomedical Services and Facilities:

- Outpatient Clinic
- Imaging Center
- Outpatient Examination and Interview Rooms
- 10 Inpatient Rooms with 20 Beds
- Magnetic Resonance Spectroscopy
- Metabolic Kitchen
- Metabolic Procedure Room
- 4 Metabolic Chambers
- Dual-Energy X-Ray absorptiometry
- Ultrasound Imaging
- Air Displacement Plethysmography
- Infant Metabolic Chamber
- Pediatric Clinic

Population Science

Our population scientists work daily to improve the health of human populations through research and advocacy of nutrition, physical activity, and the environment as they relate to obesity, chronic disease, and related risk factors.

Our population scientists work beyond the walls of Pennington Biomedical and build upon the work taking place in our basic and clinical science laboratories by translating research findings into practical guidance in health care, community, school, military and other settings. We are invested in translational and community-based research aimed at reducing health disparities and improving the overall health of the population.

This translational research expands the influence of discoveries made at Pennington Biomedical into real-world programs that can have demonstrable impacts on public health, such as Louisiana's Greaux Healthy initiative.

Achievements Yielding Results

Medical Management for Obesity: The Heads-Up demonstration project, conducted in partnership with the Louisiana Office of Group Benefits, has generated preliminary data that bariatric surgery and intensive medical management for obesity result in significant health care cost savings in patients with obesity. The results show that compared to control patients, those who underwent intensive medical intervention for obesity or bariatric surgery had 34.5 percent and 57.8 percent lower health care costs, respectively, across the first three years of treatment.

Community-Academic Partnerships: Two successful local projects demonstrated the effectiveness of partnerships with our local communities to improve health. The West Carroll Healthy Communities program, funded by NIH through Pennington Biomedical's LA CaTS Center and conducted in partnership with the LSU AgCenter, the Southern University Agricultural Center and West Carroll Parish, incorporated community engagement and planning to assess, plan, and develop interventions aimed at improving the health of that community. Our Play Streets for Safe Play pilot project explored the feasibility, community interest, and impact of a street closure program in North Baton Rouge. This project resulted in community programming by the neighborhoods and a mobile recreation unit that allowed children to play freely outside in a safe environment.

Kids and Health Technologies: Our faculty are using cutting edge technologies to develop interventions to increase physical activity in children. For example, 14-to-18-year-old girls played active video games (or "exergames") for 12 weeks in the Klub Kinect study to help prevent unhealthy weight gain. The recently initiated GameSquad intervention is reaching into home environments via the internet to stimulate children's physical activity by remotely linking children and their families to active video gaming coaches at Pennington Biomedical.

Louisiana Fit Kids: Pennington Biomedical researchers worked with the Louisiana Department of Education's Division of Nutrition Support to launch the Louisiana Fit Kids project. The project focused on the development of a comprehensive nutrition training program, which was implemented through ongoing district trainings, seminars and the development of an informative, interactive website. Major improvements are being made across the country and in Louisiana to increase access to healthy food and promote student wellness.

Promoting Successful Weight Loss in Primary Care in Louisiana: Our PROPEL study, which was supported by a $10 million grant from the Patient-Centered Outcomes Research Institute, brought together 18 medical care clinics across the state with the goal of studying the effectiveness of obesity treatment options in underserved areas. The program also tested how well behavioral obesity management can be integrated into primary care. Pennington Biomedical led an impressive list of partners in this effort including LSU Health New Orleans Tulane University, Ochsner Health, and Xavier University of Louisiana. The project demonstrated significant weight loss and weight-loss maintenance over 2 years among more than 800 patients with obesity.

Cancer Metabolism: At Pennington Biomedical, researchers are committed to exploring how weight management, diabetes control, optimal nutrition, and physical activity prevent the development and progression of cancer. A focus of the Cancer Metabolism Program has been to understand how to prevent the spread of cancer to other organs. Through our research, we have shown that aerobic exercise, like walking on the treadmill, reduces the number of circulating tumor cells in the body and potentially improves cancer prognosis.

Preventive Behavioral Medicine: African Americans suffer disproportionately from various health conditions, including obesity, hypertension, diabetes, certain cancers, and dementia. Decreased physical activity and other modifiable health behaviors have been shown to be independent risk factors for the development of these chronic diseases. At Pennington Biomedical, we utilize community-based and technology-based interventions to address these health disparities. Studies are being conducted assessing the effect of a community-based physical activity intervention in older African American adults, targeting increased physical activity in young children with a mobile phone-based intervention, and exploring how fathers can serve as catalysts for their children's health.

Our scientists are working beyond the walls of Pennington Biomedical to take our research out of the laboratory and into a variety of settings, including communities, schools, medical clinics and the military.

-Peter Katzmarzyk, PhD, Associate Executive Director for Population and Public Health Science

www.pbrc.edu/population

Grant Funding:

- 20 awards totaling $5.3M in 2023-24
- $33M in active grant funding

Scientific Cores

Pennington Biomedical provides its researchers with state-of-the-art basic and clinical core services designed to improve efficiency, timeliness, and precision of vital technical procedures needed across research boundaries.

Core Services support research efforts and provide our scientists with access to cutting-edge technology and focused technical procedures to further their discoveries. Basic Science services include microscopy and imaging of cells and tissues, cell culture facilities, comparative biology, animal metabolism and animal behavior. Additional services are also available in the areas of genomics and transgenics.

Clinical Science core services assist clinical activities and provide full support for clinical research studies and trials, from protocol development and Institutional Review Board submission to budgeting and contract assistance. Clinical services include participant recruitment, phlebotomy, biological specimen collection, processing and analysis; exercise testing; dietary assessment; and psychological assessment.

Pennington Biomedical also offers both inpatient and outpatient options for research trials performed here. Additional clinical services include preparation of meals by the metabolic kitchen, data collection and storage of medical records, medication preparation in the pharmacy, ingestive behavior assessments, imaging procedures using both MRI and DXA, and assessments of metabolism in the metabolic chambers.

Core laboratories provide services that can be shared by many users and are applicable to multiple experiments or studies. One of Pennington Biomedical's internal priorities is service to the scientists, and the Center provides the critical infrastructure needed to successfully complete the multiple experiments being performed daily.

www.pbrc.edu/cores

Pennington Biomedical's Cores offer comprehensive support for all aspects of the Center's research from the labs to the clinic and beyond.

-Jennifer Rood, PhD, Associate Executive Director for Cores and Resources

Pennington Biomedical Cores:

- Animal Metabolism and Behavior
- Bioinformatics and Computational Biology
- Cell Biology and Bioimaging
- Comparative Biology
- Genomics
- Genetically Engineered Models
- Clinical Chemistry
- Clinical Trials Unit
- Database Management
- Dietary Assessment and Food Analysis
- Exercise Testing
- Imaging
- Mass Spectrometry
- Metabolic Kitchen
- Recruiting
- Biostatistics

Renee P. Stelzer, Director of the Metabolic Kitchen, carefully measures ingredients for one of the many active studies requiring food preparation.

Centers & Institutes

Pennington Biomedical is proud to be home to several NIH-funded research centers, along withother state and federally funded partnerships. Supported by center grants, these prestigious designations are awarded to institutions with groups of established investigators working in areas of scientific emphasis as defined by the National Institutes of Health. The goal of all NIH-funded centers is to power the discovery process and advance science by facilitating and enhancing their collaborative efforts. In addition, other center and institute partnerships highlight Pennington Biomedical's work with the military, bariatric surgery and healthy aging.

The establishment and support of centers is part of a broader strategy of the NIH, whose goal is to more effectively translate scientific discoveries into improvements in people's health.

Louisiana Clinical & Translational Science (LA CaTS) Center

Pennington Biomedical established the Louisiana Clinical and Translational Science (LA CaTS) Center with funding from a National Institutes of Health grant. LA CaTS unifies 10 Louisiana institutions through a novel infrastructure that generates collaborative clinical and translational research to collectively address health disparities and improve outcomes in underserved populations with chronic diseases. For more than a decade, LA CaTS has brought more than $280 million in extramural grant awards, including nearly $200 million in NIH funds, to Louisiana. It has shared new scientific knowledge gained through research worldwide through more than 1,900 published research articles and 900 invited scientific presentations.

Nutrition Obesity Research Center (NORC)

Pennington Biomedical's vision emphasizes the theme of "nutrition and metabolic health through the lifespan" with emphasis on mechanisms, prevention, and treatment modalities. The NIH-funded research base on which the Pennington Biomedical/Louisiana NORC was initially established includes basic, clinical and population research addressing the most prominent causes of morbidity and mortality in the United States related to nutritionally induced chronic diseases, many of which are linked to obesity.

Metamor Institute

The Metamor Institute is a partnership among Pennington Biomedical Research Center, Our Lady of the Lake Regional Medical Center, the Office of the Governor of Louisiana, Louisiana Economic Development, LSU Health New Orleans School of Medicine, and the Pennington Biomedical Research Foundation. Metamor is the first institute in the nation to offer an integrated and multidisciplinary approach to caring for individuals who suffer from these devastating diseases in a single facility. The Metamor team utilizes a variety of treatment approaches, including lifestyle interventions, drug and combination therapies, and surgical procedures performed in state-of-the-art facilities at Pennington Biomedical and Our Lady of the Lake Regional Medical Center.

Exterior view of the Metamor Institute, a leading bariatric clinic specializing in transformative weight-loss treatments and research.

Pennington Biomedical has a long history of collaboration with institutions across the state, country and the world, and these centers of excellence represent the fruit of those collaborations.

- John Kirwan, PhD, Executive Director

Institute for Dementia Research and Prevention (IDRP)

The IDRP brings together multiple scientific disciplines within the clinical research arena in order to find novel ways of preventing, detecting, and managing dementia in the elderly. Its longitudinal studies provide a platform for the collection of data to identify the most important risk factors for the development of dementia, elucidate novel targets for the design of new therapeutic interventions, and develop new tests for more effective detection and monitoring of the earliest stages of dementia. The Louisiana Aging Brain Study (LABrainS) is the cornerstone project of the IDRP and is essential to its success. Since launching, LABrainS has enrolled more than 2,000 participants representing 37 Louisiana parishes.

Metabolic Basis of Disease Center (MBDC)

The Metabolic Basis of Disease Center (MBDC) was developed to support early-career scientists as they study the metabolic networks that become dysregulated during the progression of various diseases, such as diabetes, obesity, preeclampsia, and anxiety. The Metabolic Basis of Disease Center's goal is to increase the number of scientists whose research addresses important health challenges while enabling these young investigators to establish independent research programs with sustainable independent funding.

Center for Military Performance & Resilience (CMPR)

Pennington Biomedical's strong history of collaboration coupled with world-class research capabilities and facilities support the Center for Military Performance & Resilience, which identifies novel strategies for the optimization of readiness, performance, health and resilience.

Since 1989, Pennington Biomedical and the U.S. Department of Defense have operated in a productive relationship that has resulted in the support of more than 160 projects and more than 110 jointly authored scientific publications. These projects have resulted in better understanding of soldiers' energy and nutrition requirements, improvements in operational ration nutrition standards, modification of garrison feeding to improve health during basic training, development and dissemination of unique technology to improve the health of soldiers and their families, and better understanding of the role of nutrition, physical activity, and sleep habits on soldier performance and resilience.

www.pbrc.edu/centers

Dr. Jennifer Rood, Associate Executive Director for Cores and Resources, describes a new Department of Defense (DOD) grant.

Scientific Education

As a community of scientific researchers, Pennington Biomedical faculty and staff work daily – both individually and collectively – in pursuit of new discoveries that contribute to fundamental knowledge and improve health. But they also have a unique opportunity and obligation to influence future scientists by fostering new and early career investigators. Researchers have an opportunity to shape their professional development by mentoring them on how to be productive contributors to both science and the community.

At Pennington Biomedical, great pride is taken in mentoring the next generation. The Division of Scientific Education administers programs in three major areas: training the next cohort of scientists, producing scientific conferences that focus the Center's research efforts and attract world-renowned scientists to our center, and organizing professional and community education outreach programs to engage both the residents of Louisiana and the state's health care community.

To accomplish this, the Division of Scientific Education directs programs for postdoctoral fellows designed to help them become productive research scientists capable of establishing independent scientific careers in biomedical research. The division coordinates the placement of students in Pennington Biomedical laboratories each year from universities and medical schools throughout the world to provide hands-on experience in research and laboratory skills.

www.pbrc.edu/scientific-education

Pennington Biomedical has served as a premier postdoctoral training institution for more than 30 years. In addition to a robust postdoc training program, we share the latest discoveries with the community through events, presentations, videos and more.

-Leanne Redman, PhD, Associate Executive Director for Scientific Education

Programs:

- Work in Progress
- Visiting Speakers
- Lunch & Learn events
- Responsible Conduct of Research
- Postdoctoral mentoring
- Bray Obesity Symposium
- Scientific Symposia
- Fellowship Opportunities:
  - LAUNCHED
  - Obesity Medicine Fellowship
  - Obesity T32
  - COBRE
  - LA CaTS

Inside the Pennington Biomedical library, featuring an extensive collection of resources on medical, nutrition, and clinical research.

Business Development

Business Development & Commercialization enables inventions, discoveries, and creations from Pennington Biomedical to move from the laboratory to the market, improving lives through technologies designed for the biomedical diagnostic, treatment, and prevention arenas.

The office is responsible for all aspects of commercialization, including patenting, technology licensing, and other technology-related activities. It also provides services for material transfer agreements, confidentiality agreements, and other technology-related functions.

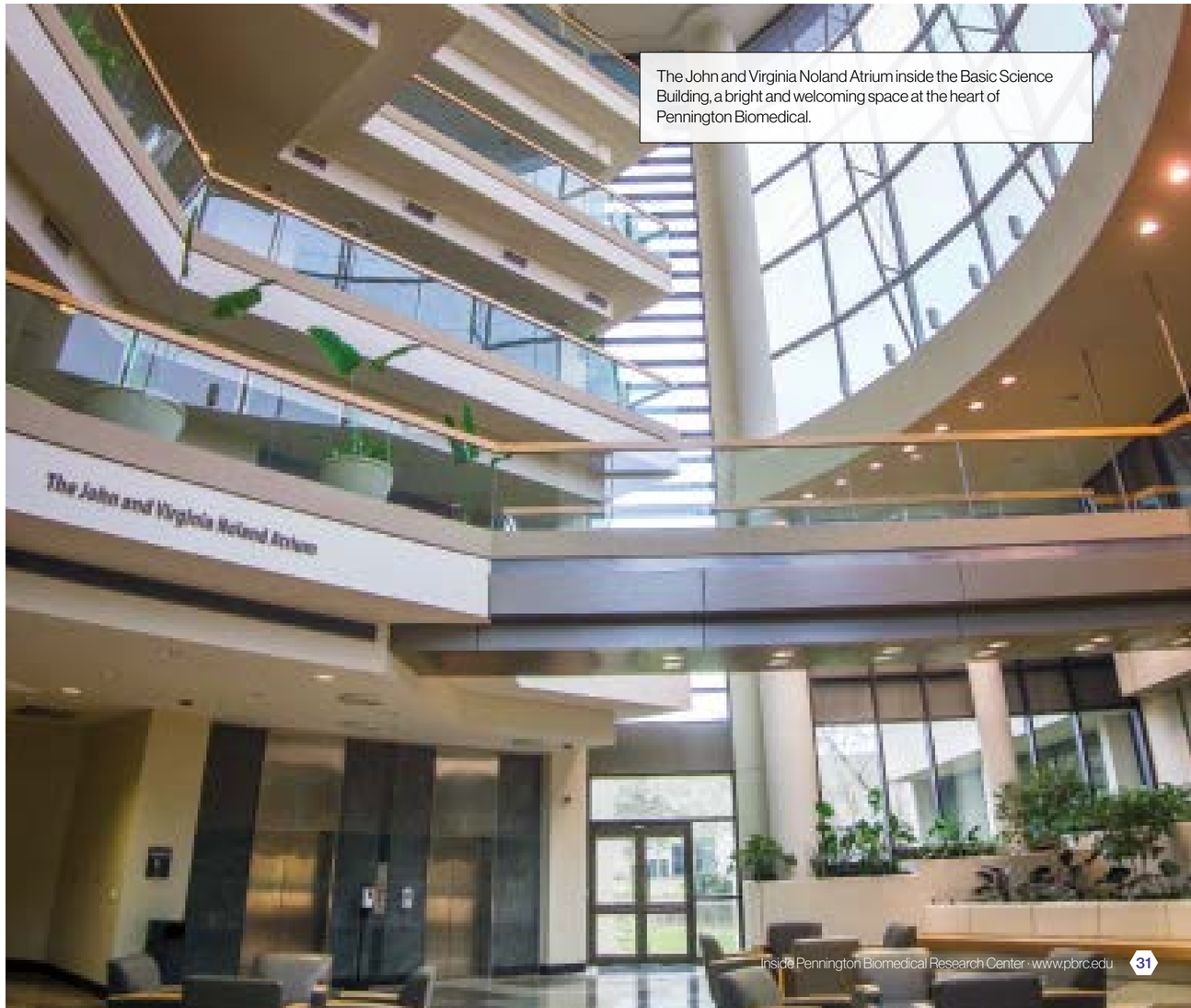
A key component of activities includes establishing networks of partners to engage with Pennington Biomedical in fulfilling the Center's mission. These partners may be in the private sector, in which case their support is sought for mutually beneficial research and development activities. For example, working closely with researchers, the office negotiated a multi-year development and license agreement under which a global company will incorporate Pennington Biomedical technology into their current product portfolio.

ARPA-H : The Advanced Research Projects Agency for Health is a nationwide health innovation network, headquartered in the Department of Health and Human Services office in Washington, D.C. ARPA-H accelerates better health outcomes for all by supporting the development of high-impact solutions to society's most challenging health problems. ARPA-H operates regional hubs: an Investor Catalyst Hub based in the Greater Boston area; a Customer Experience Hub in Dallas; and a Stakeholder and Operations Hub in the Washington, D.C., region. In 2024, Pennington Biomedical was named a spoke in both the Customer Experience and Investor Catalyst Hubs.

Beta-Cell: Pennington Biomedical is collaborating with Beta-Cell NV - a Belgian biotech company that specializes in innovative cell therapies to treat type 1 diabetes - to secure grant funding to advance the development of cell replacement therapies. These innovations hold promise for delivering long-term solutions and improving life quality for diabetes patients worldwide.

KSA: Pennington Biomedical leadership are meeting with delegations in the Kingdom of Saudi Arabia on projects to progress the Center's mission of advancing healthcare and biomedical research. Key partnerships and projects include work toward establishing a first-of-its-kind Metabolic Wellness Center to serve as a hub for clinical treatment, research and development, and professional training in obesity medicine and metabolic health in Sultan Bin Abdulaziz Humanitarian City. The partnership will also work toward establishing precision medicine advances with King Faisal Specialist Hospital & Research Center focused on cancer and diabetes, postdoctoral research opportunities with the Research, Development, and Innovation Authority, along with other opportunities being discussed in the region.

www.pbrc.edu/business-development



The John and Virginia Noland Atrium inside the Basic Science Building, a bright and welcoming space at the heart of Pennington Biomedical.

Administration & Budgeting

Pennington Biomedical's research is supported by an array of administrative services. The operating model for administrative units is centered on a common goal of easing the administrative burden for our scientists so that they can remain focused on their research and stay competitive and productive.

In addition to Business Development and Commercialization, administrative services include Communications and Marketing, Computing Services, Facilities Management, Fiscal Operations, Human Resources, Legal and Regulatory Affairs, and Sponsored Projects.

Communications and Marketing provides strategic, proactive and directed expertise for outreach related to media, public relations, and marketing for the Center and the science therein, as well as support for recruiting for clinical trials

Computing Services works to improve efficiency and enhancement for the Center's research activities, identifies researchers' information technology needs and implements solutions.

Facilities Management directs operation and maintenance services, security, environmental controls and grounds maintenance, and construction project design supervision and monitoring.

Fiscal Operations provides fiscal management services, ensures compliance with all related laws and regulations, enables timely procurement and delivery of goods and services, and oversees business-related functions and services.

Human Resources provides services for recruitment, employment, benefits, immigration, reporting, retention and reward of faculty and staff, and ensures compliance with all applicable employment laws.

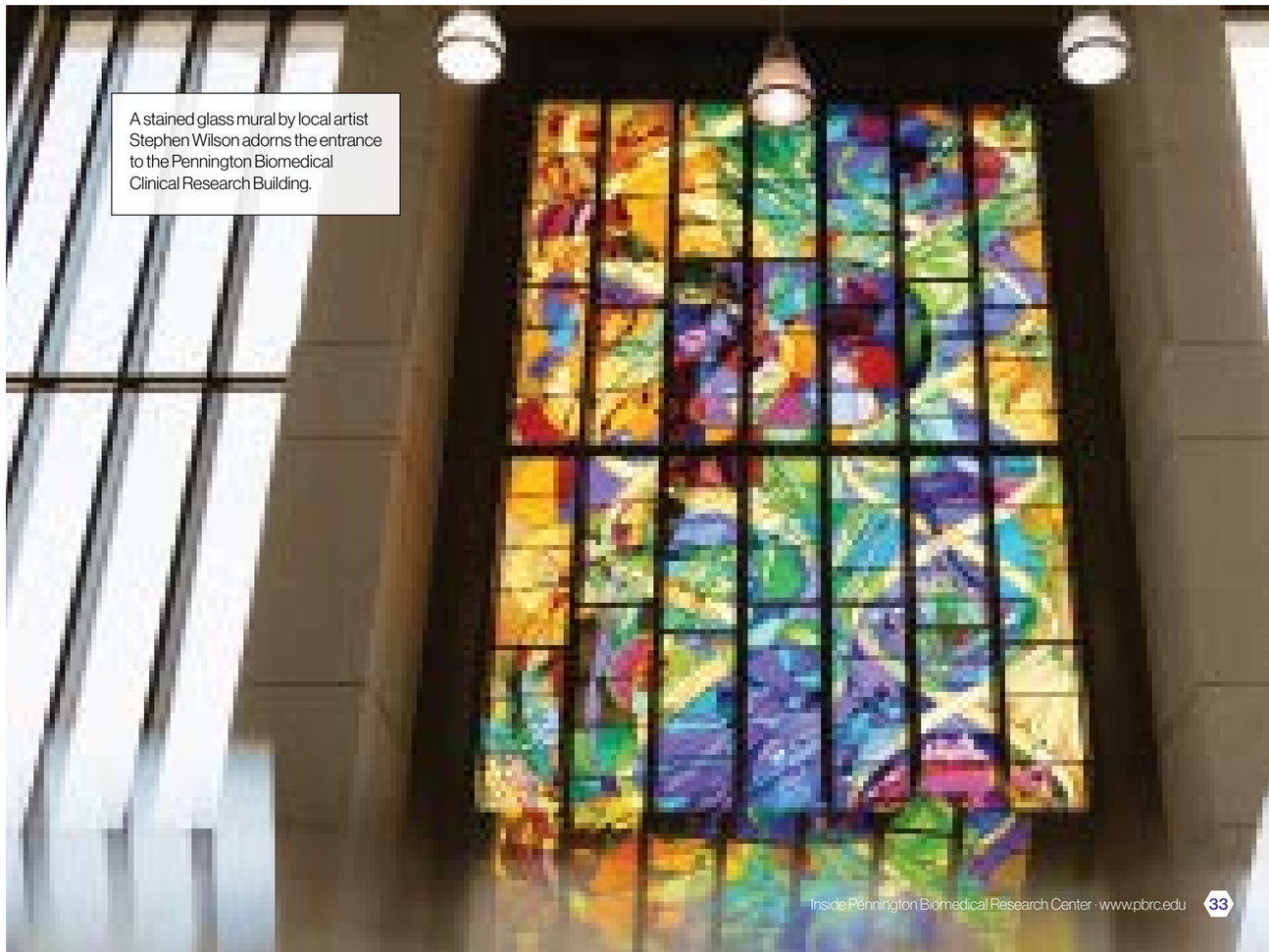
Legal and Regulatory Affairs oversees legal, regulatory and compliance functions for the Center and serves as the liaison to other regulatory offices and programs. The department is responsible for HIPAA compliance and works closely with the Institutional Review Board and other Pennington Biomedical compliance components.

Sponsored Projects Services provides proposal review support including budget development, contract preparation and negotiation, reporting, sub-recipient monitoring, post award modifications and interpretation of sponsor regulations and requirements.

www.pbrc.edu/about

Pennington Biomedical by the Numbers:

- 730,000 square feet of research space
- 600+ team of faculty, adjunct faculty, postdoctoral researchers, research associates, technicians, support and administrative personnel
- 44 laboratories
- 15 specialized core service facilities
- 4 metabolic chambers
- The world's only functioning infant metabolic chamber



A stained glass mural by local artist Stephen Wilson adorns the entrance to the Pennington Biomedical Clinical Research Building.

Annual Events

Each year, Pennington Biomedical's researchers and staff craft community events to welcome the broader community to the campus. As metabolic health factors differ among demographic groups, the events are tailored to specific populations. Researchers who are among the leaders in their respective fields, along with local health officials and motivational speakers, attend each event to lead educational sessions. Staff from partnering health care organizations lead engaging exercises and various screenings as Pennington Biomedical welcomes the community onto campus.

Irene W. Pennington Wellness Day for Women

When the Irene W. Pennington Wellness Day for Women was first held in 2001, the event planners could not have foreseen how impactful the wellness day would become so many years later. The Wellness Day for Women has become a hallmark of the community events offered by Pennington Biomedical, welcoming hundreds of participants annually for a day of health screenings, educational programs, and heart-pumping activities. Named for Pennington Biomedical benefactor Irene W. Pennington, the wellness day brings the latest research from the Center directly to the Baton Rouge community.

The general themes of the wellness day prioritize common and timely issues facing women around the country, and in recent years, the day has prioritized mind and body wellness, as four-out-of-10 women report feelings of stress. Pennington Biomedical is frequently joined by healthcare partners in the community to develop and sustain the event.

Senior Black American Health Fair

From heart disease to dementia, the African American community experiences higher rates of chronic disease when compared to other ethnic groups. This is the motivation behind the Senior Black American Health Fair, which was first held in 2021 and has since become one of Pennington Biomedical's most attended events. The event, typically held in the spring, features uniquely tailored health screenings and educational presentations from local leaders and medical professionals. Throughout the day, music, dancing, and fun exercises get participants on their feet and moving. African American seniors can meet directly with Pennington Biomedical researchers and local physicians to getting a clear picture of the health issues that are more pronounced in their communities.

Men's Health Summit

Many people know men in their lives who do not prioritize their health, but as summer winds to a close, Pennington Biomedical opens its doors to the men of the Baton Rouge community for the annual Men's Health Summit. More and more, men are discovering the value of regular health screenings and checkups, which the Men's Health Summit provides, thanks in part to the participation of local healthcare organizations. Educational programs, featuring topics such as heart attack prevention, health goals over 50, and more provide the audience with the latest in medical research and discoveries. The event is typically capped off with a keynote address from motivational speakers.

www.pbrc.edu/outreach

Three major community events are held each year in the C.B. Pennington, Jr. Conference Center – Irene W. Pennington Wellness Day for Women, Senior Black American Health Fair and Men's Health Summit.

Greaux Healthy

Greaux Healthy is an evidence-based public service initiative by Pennington Biomedical Research Center, in partnership with the State of Louisiana, focused on preventing and treating childhood obesity. The initiative's team of researchers and professionals are dedicated to being a trusted partner in growing healthier generations for Louisiana communities.

With Louisiana's growing issue of childhood obesity and with the insights and discoveries made at Pennington Biomedical, Louisiana's leadership supported the creation of the Greaux Healthy initi-ative to address the crisis. Pennington Biomedical is taking action to deliver resources developed from decades of impactful research throughout Louisiana communities.

Greaux Healthy is designed to translate, imple-ment, and disseminate childhood obesity prevention and treatment research with greater speed, fidelity, efficiency, quality, and reach. Greaux Healthy's resources support expectant parents, families and caregivers, teens and young adults, educators, healthcare providers and community leaders addressing the growing childhood obesity crisis.

Prevention: Prevention resources are designed to improve physical activity levels, nutritious meals, and posi-tive health behavior changes for children and families across the lifecycle. Programs are available for early childcare centers, families of preschoolers, and schools. Digital health education for ex-pecting families through young adulthood is available through the initiative's website, mobile ap-plications, and social media pages.

Treatment: Pennington Biomedical researchers are at the forefront of advanced treatment options for obesity. Greaux Healthy treatment resources are tailored to support Louisiana healthcare providers utiliz-ing the recommended treatment protocols with educational trainings, toolkits, and comprehen-sive family-based programs for clinics. Greaux Healthy offers

online education to families and pro-viders on medication therapies and metabolic surgery.

Research: Pennington Generation is a research study that aims to partner with Louisiana fami-lies to learn more about how physical activity, nutrition, sleep, and other factors affect chil-dren's health and growth. The Pennington Generation longitudinal study will follow a cohort of 1,500 Louisiana fami-lies, tracking health behaviors and risk factors associated with childhood obesity. Pennington Gen-eration helps us learn more about childhood development and the causes and consequences of obesity. We'll use what we learn to help create effective programs that prevent and treat child-hood obesity. You will see these efforts come to life in communities across Louisiana through the Greaux Healthy initiative. And our Pennington Generation mobile health unit will visit commu-ni-ties across the state to make it easier for families to participate!

www.greauxhealthy.org

Greaux Healthy
Pennington Biomedical

The Foundation

Pennington Biomedical has always understood the importance of philanthropy. The transformational gift from Doc and Irene Pennington created what is considered one of the foremost research institutions focused on the most significant health issues of our time.

Pennington Biomedical's extraordinary mission has been advanced even further through the ongoing support of individuals, companies and foundations across Louisiana and beyond that recognize the importance of investing in the Center's research.

Pennington Biomedical Research Foundation is a nonprofit, 501(c)(3) organization and is affiliated with the Pennington Biomedical Research Center to accept, manage and steward private philanthropy through unrestricted, restricted and endowed gifts from individuals, corporations and foundations.

Philanthropic investments through the foundation have provided significant returns, as Pennington Biomedical's impact has been felt across the globe, advancing our understanding of today's chronic diseases. Whether it is the many drug therapies that are tested to treat obesity and diabetes, the diet and behavior interventions that improve health, nutritional needs that have been met for our military, or the efforts to prevent diseases across the lifespan from childhood obesity to dementia, Pennington Biomedical is making a difference thanks to the transformative support of generous donors to the Foundation.

pbrf.org

In formulating the original Foundation, my only instructions were that this should be the biggest and best nutrition research center in the country.

– C. B. Pennington, 4/21/1983

Benefactor C.B. "Doc" Pennington's succint statement of his vision is preserved.

Small Shifts

Taking care of our employees is central to the mission at Pennington Biomedical. We believe that supporting health and well-being starts from within, extending from the workplace to the broader community. Through our *Small Shifts* campaign, we empower employees and community members alike to make manageable lifestyle adjustments that can lead to substantial health benefits over time. While Pennington Biomedical's research tackles nutrition, obesity, and diabetes using advanced technology, we recognize that significant change often begins with small, consistent steps. By encouraging these shifts, we aim to prevent, treat, and ultimately end disease in sustainable and impactful ways.

Small shifts are something that everyone can do and can be incorporated into everyday life. Small shifts add up, and they are reinforcing, which further promotes the activity. From swapping a soft drink with water to parking farther away from the front door, small changes in behavior can generate positive net effects that aren't easy to accomplish otherwise.

Small shifts, such as choosing a piece of fruit over a sugary treat or taking a 10-minute walk after work rather than dropping onto the couch, can have a lasting impact on health over time. Drastic lifestyle changes can be overwhelming and difficult to maintain, but the small shifts encouraged in this new campaign can make lifestyle changes more manageable, sustainable and less stressful.

pbrc.edu/smallshifts

Pennington Biomedical has identified key benefits to embracing small shifts, including:

- **Sustainability:** Small changes are easier to sustain over time, making it more likely that you'll stick to your healthier habits.
- **Reduced Stress:** By focusing on manageable shifts, you can avoid the stress and anxiety often associated with drastic lifestyle changes.
- **Achievable Goals:** Small goals are attainable, leading to a sense of accomplishment and motivation to continue your journey.
- **Long-Term Health:** Consistency in small shifts can lead to significant improvements in your health and well-being over the years.

To take part in Pennington Biomedical's "Small Shifts" campaign, people are encouraged to sign up online at pbrc.edu/smallshifts.







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