

Advanced Medical Technology



St!Louis
Perfectly Centered. Remarkably Connected.

The Advanced Medical Technology companies of the St. Louis region are a rich mix of new and old, innovative and storied. This broad array of successful medical device and imaging companies has been fostered by a supportive local capacity for biotech research and engineering.

The St. Louis region has a well-established Life Science industry, including biotechnology. Our region has a strong cross collaboration between clinical trials, academic research, and corporate development. This 'bench to bedside' spectrum encourages entrepreneurship and growth. The region has over 17,750 jobs and 360 establishments in the medical devices and biotech supporting industry sectors. Forty-five firms focus on research and development of biotechnology alone, employing over 3,000 St. Louisans. The number of firms and employees in the biomedical sector continues to grow, as the community of medical companies gains strength in the region.

St. Louis is a prime location for startups and growing companies seeking a collaborative workforce and cost efficient location. *Forbes* magazine ranked St. Louis second on its "Most Affordable Places to Live Well" list in June 2009. This rating is based on housing affordability, cost of living, quality of life, and arts and leisure offerings. The region's high quality of life and affordability allows businesses to attract and retain talented biomedical and life scientists at wages that are lower than the national average. Wages for biomedical engineers, medical scientists, and biological, medical, and clinical laboratory technicians are 86% to 98% of the national average.

The St. Louis region is a leader in biomedical education and training.

Several top academic and research institutions in St. Louis provide renowned training in biomedical engineering and medical research. A few of those programs include:

Washington University School of Medicine in St. Louis was ranked third in the nation in 2009 and serves as a national research powerhouse. In 2009, Washington University received \$382.5 million from the National Institutes of Health (NIH). The university was awarded an additional \$90.3 million for projects funded by the American Recovery and Reinvestment Act (ARRA). In early 2010, the first tenants of the 11-story BJC Institute of Health at Washington University began to move in. The Institute is home to the BioMed 21 initiative, which is designed to speed scientific discovery and rapidly apply breakthroughs to patient care. The building is designed to facilitate teamwork and interactions. The labs are open and share conference rooms and break areas will encourage interaction and conversation. The facility will house the Genome Sequencing Center, the Center for Genome Sciences, the Institute of Clinical and Translational Sciences, and Center for Clinical Imaging Research. Interdisciplinary Research Centers in BioMed 21 include: Center for Cancer Genomics, Center for the Investigation of Membrane Excitability Disorders, Hope Center Program on Protein Folding and Neurodegeneration, and Center for Interdisciplinary Studies of Diabetic Cardiovascular Disease.

"The level of engineering talent in this community is amazing. If you have an issue, I would venture to say you can get it figured out more quickly here than anywhere."

-Carter Williams, Founder of Boeing's Corporate Venture

Creating the next generation of health care: Washington University Genome Sequencing Center

The Genome Sequencing Center at Washington University School of Medicine, one of three genome centers in the United States, focuses on the large scale generation and analysis of DNA sequence. The center plays a leadership role in The Human Genome Project constructing the clone map and contributing 25% of the finished sequence. To better understand the human genome sequence and to advance the study of biology, the center sequenced the genomes of other species as well. The Washington University Genome Sequencing Center is involved in several sequencing projects, which include the Maize Project, Non-Human Primates, Human Gut Microbiome Initiative, The Cancer Genome Atlas, and Genomics of Acute Myelogenous Leukemia.

The open sharing of genomics methodology and the rapid release of sequence data via their website serves to empower other researchers and facilitates the elucidation of gene function, forming the ultimate basis for an understanding of how DNA sequence dictates the form and function of an organism, both in health and in disease.

Other academic research drivers include, **Saint Louis University School of Medicine**, which recently opened the \$80.5 million Edward A. Doisy Research Center to focus on research in the health sciences. Researchers in the state-of-the-art building are working on five key areas of scientific discovery: cancer and molecular biology, liver disease, cardiovascular disease, neurosciences and aging and vaccine development. In 2009, SLU received \$14 million in funding from NIH and nearly \$4 million from the ARRA. It is one of four U.S. Centers for Excellence in BioDefense and Emerging Infectious Diseases Research. The school is a pioneer in vaccine research, immunology, geriatric medicine, and organ transplantation.

The **University of Missouri-St. Louis** has over 15,700 students and administers two incubators. The UMSL graduate Department of Biology currently has over 130 candidates, including over 11 pursuing PhDs in various sub-disciplines, such as their Biotechnology Program.

Southern Illinois University Edwardsville has over 13,000 students, as well as a dental school, a fully accredited nursing school, and a new pharmacy school. The 330-acre campus includes University Park, a research and technology business park, with finished wet-lab space suitable for tenant research capabilities and additional space available for tenant fit-up for future wet-labs.

The **St. Louis Community College-Florissant Valley** bioscience initiative is a program that was initiated to allow students to receive a specialization in biotechnology at the community college level. The associate's degree in applied science in biotechnology is providing a larger pool of qualified laboratory technicians and research assistants for area companies and research universities. The community college has also cooperated with the University of Missouri-Columbia and Southeast Missouri State University to offer combined courses that lead to Bachelor of Science degrees in biotechnology.

St. Louis area colleges and universities offer a wide range of biology-based science degrees. Area schools awarded nearly 380 Associates and Certificates, 1,700 Bachelors, and 585 Masters or Doctoral degrees in biology in academic year 2008-2009. Universities are also doing a great deal to encourage students to become interested in the growing biomedical sector through career centers and internship programs. For nearly a decade, Washington University in St. Louis and Saint Louis University have been graduating over 100 biomedical engineers annually.

The St. Louis Community Colleges Center for Plant and Life Sciences bio-technician training program occupies 10,500 square feet of space at BRDG Park at the Danforth Plant Science Center. This biotech workforce development and training program has been recognized for excellence by the Missouri Biotechnology Organization (MOBIO).

In addition to providing a well trained workforce, universities are a driving force behind the region's growth in medical and life sciences research. Greater St. Louis education attainment levels are higher than national averages for both bachelors degrees and graduate degrees.

The St. Louis region has the right infrastructure for biomedical companies.

Advanced technology incubators in St. Louis bring increasing levels of support and collaboration opportunities for biomedical startups. St. Louis is constantly expanding available space at an affordable cost. Many of the incubators are strategically located close to other companies, universities, and hospitals. St. Louis is committed to building a network of research, technology, and business support for new companies.

The **Center of Research Technology and Entrepreneurial Exchange (CORTEX)** is a collaboration of Washington University in St. Louis, Saint Louis University, University of Missouri-St. Louis, Barnes-Jewish Hospital Foundation and the Missouri Botanical Garden. It includes a \$36 million, 170,000-square-foot laboratory and office building in midtown St. Louis in the area between the medical schools of Washington University and Saint Louis University. Solae, a joint venture between DuPont and Bunge, recently are located in a 100,000-square-foot, \$40 million world headquarters in CORTEX.



The 240-acre redevelopment district is zoned and planned to be a preeminent life sciences neighborhood, centrally located amid St. Louis' cultural amenities. It includes:

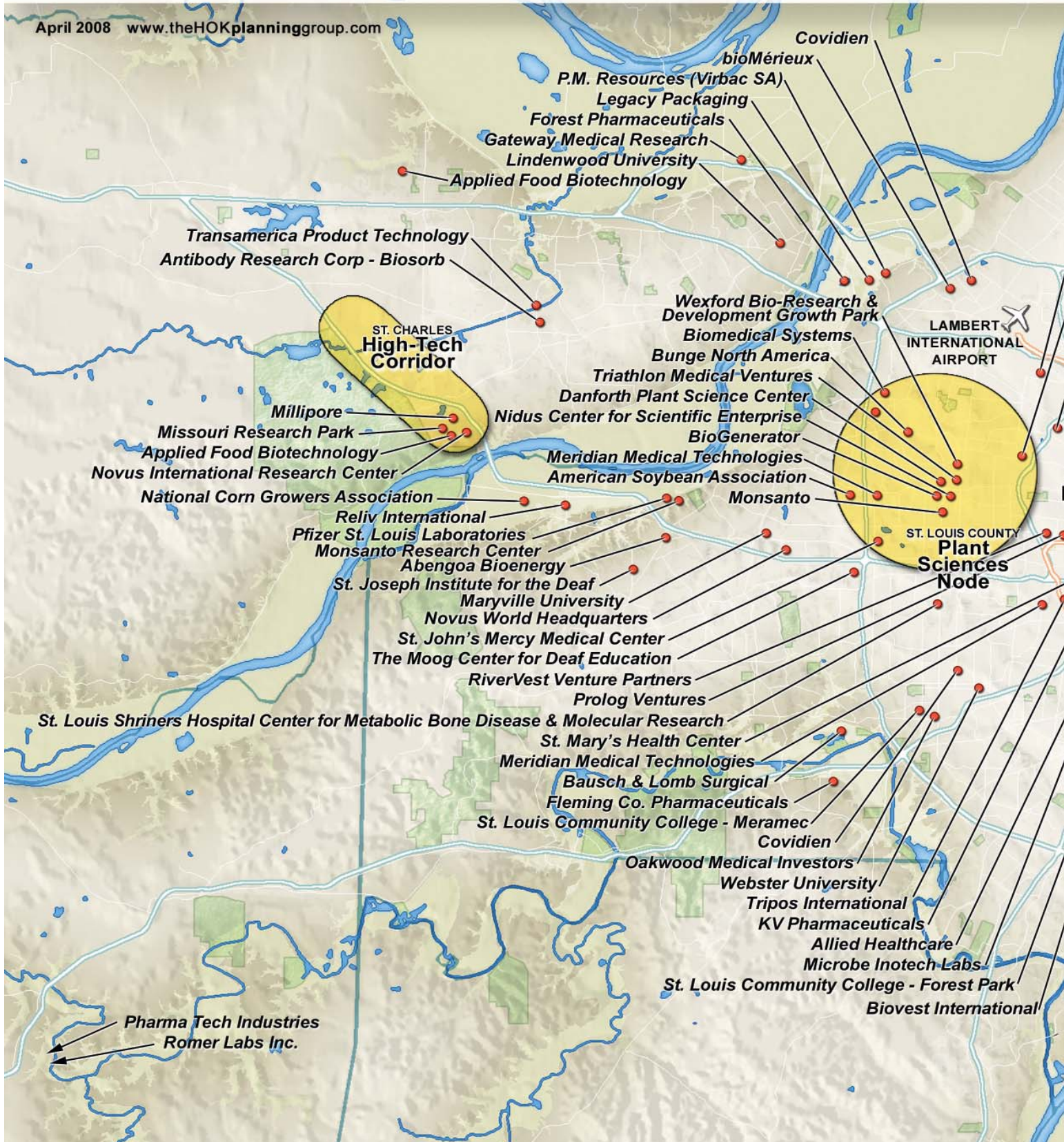
- 14,000 available square feet
- Lease agreements at \$22 per square foot
- Additional land available for development
- Proximity to desirable urban housing and neighborhoods
- Connected by Metro St. Louis light rail system to downtown and area universities

Center for Emerging Technologies (CET) is a 92,000-square-foot private, not-for-profit incubator that develops startup companies in biotechnology, biomedical engineering, advanced materials, and electronics. In 2004, Stereotaxis, the developer of an advanced cardiology control system for use in surgery, became the first of its companies to complete a public offering. CET has been recognized by the National Business Incubation Association as one of the top 10 incubators in the country. Stereotaxis now resides in the first CORTEX building.

Current CET biotech tenants include BioSynthema, C2N Diagnostics, Cardialen, Endostim, Expo Technologies, Galera Therapeutics, Grove instruments, Kereos, Lickenbrock Technologies, Lynxess, Medros, Pepex Biomedical, Pulse Therapeutics, TradeHarbor, Tranxxsson, Vasculox, VirRx, yrtopia, and ZanoGen BioSciences.

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BRDG Park at the Danforth Plant Science Center helps life science companies bridge research, resources, and relationships to achieve commercial success. In addition to providing world-class wet laboratories, office space, and a prominent incubator, BRDG Park's location on the Danforth's Center's campus facilitates access to the intellectual capital of top scientists, as well as to greenhouse, growth chambers, microscopy and proteomics facilities and other vital resources. Located in suburban St. Louis County, Missouri, BRDG Park is being developed by Wexford Science+Technology LLC, a privately held real estate developer and investment company that has developed seven major research parks nationwide. One of the BRDG Park tenants is Nidus, an investment partnership with regional business interests to attract and grow early-stage technology-based companies in agriculture, energy, and animal and human health. The partnership is a collaboration of corporations and experienced entrepreneurs working to advance early-stage technologies toward commercialization. Nidus leverages both risk capital and entrepreneurial talent to help meet market needs of potential buyers by providing the funding, experience and market input necessary to improve prospects for near-term return on investment and reduce exit risk. Other tenants include Monsanto, Divergence and Phycal.

BioGenerator is a non-profit corporation that facilitates the formation of plant and life science companies in the St. Louis region. It identifies promising university-based life science technologies, then provides the seed funding and other professional resources and support to turn the technology into early-stage companies. Founded in 2003, major contributors to BioGenerator include the Danforth Foundation, the James S. McDonnell Foundation, Monsanto, Bunge North America and CORTEX.

University of Missouri – St. Louis IT Enterprises (ITe), is a life science convergence facility, located by the UMSL campus, Lambert-St. Louis International Airport, and within minutes from area hospitals and other incubators.

IT Enterprises, a 56,300-square-foot incubator, houses multiple startup companies in the high-growth fields of information technology and life sciences, providing necessary wet lab space, bench space, and super computing. ITe fosters collaborations between tenant companies and faculty/students that provide solutions to R&D questions and problems. Companies receive assistance in obtaining collaborative grants and contracts with faculty/students. Current biotech tenants include Alsermin and MOgene.



The St. Louis region leads in innovation.

The nanotechnology company, **PixelEXX Systems**, in conjunction with researchers at Washington University, is working to bring nanoarrays to market. Nanoarrays hold potential for cancer and drug research, which could lead to improvements in drug safety and efficacy. This technology affords more accurate and precise imaging of cell physical features, such as biochemistry, electrical charges, and electromagnetic fields. Nanoarrays were discovered at Washington University and licensed to PixelEXX, which was led by Dr. Samuel Wickline, Stuart Solin, Kirk Wallace, and Mike Hughes. PixelEXX has received significant seed funding and has chosen to locate at the CORTEX One facility in Midtown St. Louis.

The **Siteman Center of Cancer Nanotechnology Excellence (SCCNE)** at Washington University, in collaboration with the University of Illinois Urbana-Champaign (UIUC) and the Alvin Siteman Cancer Center, is providing a research and clinical resource in the Midwest for both the fundamental exploration of nanotechnologies applied to cancer and also their translation, commercialization, and application in the clinical environment. Scientists and physicians affiliated with Siteman hold nearly \$150 million in cancer research and related training grants. The results of basic laboratory research are rapidly incorporated into treatment advances. This process is enhanced by patient access to more than 350 clinical studies, including many collaborative efforts with other leading cancer centers throughout the country.

The St. Louis region invests in successful companies.

More and more companies are realizing the advantages of starting and building competitive companies in St. Louis. One of St. Louis' greatest assets for biomedical companies is the venture capital support that is dedicated to medical and life science companies.

Venture Capital

The St. Louis biotech industry has attracted the interest of venture capitalists from around the world. The area is the home or branch office for 16 funds with over \$1 billion under management dedicated to life sciences. This growth coincides with a rise in the area's reputation in venture capital circles.

Reflecting the opportunities in the region, several firms are currently raising venture capital follow-on rounds. A new fund-of-funds, Vectis Life Sciences Fund, recently began making investments into life science venture capital funds with ties to the region.

To complement the area's venture capital resources, the St. Louis Arch Angels were established in January 2005. Arch Angel members provide seed and early-stage life science capital in the range of \$250,000 to \$2 million, an investment range not generally served by VCs. The members, who are business leaders from the St. Louis area, also mentor and coach, serve on boards, provide contacts, and assist with team-building, strategic planning, and fund-raising.

The St. Louis region is home to a range of mature, growing and startup companies, all committed to building a community of biomedical technology research and innovation.

Many new companies in the region are paving the way for innovation in bioengineering:

Veran Medical Technologies is a prime example of the kind of companies making St. Louis home. Veran relocated its headquarters from Nashville to St. Louis in 2008 in order to build relationships with the local medical community. Veran Medical Technologies is a privately-held, image-guided medical device company focused on developing the next standard of care for minimally invasive delivery of interventional oncology therapies. Veran provides 4-D registration capability for precise targeting of lesions via its FDA cleared platform. The Veran platform aims to reduce procedure times and increase accuracy enabling clinicians to cost effectively treat patients with reduced co-morbidity risk. Veran secured \$4.75 million in St. Louis venture capital and private financing to drive adoption of its IG4 delivery system for minimally invasive biopsy and ablation of cancer. St. Louis-based Prolog Ventures led the round and was joined by Advantage Capital Partners and existing private investors.

Envisioneering develops scanning technology that improves accuracy and outcomes of prostate diagnosis and treatment. The company's first product, the TargetScan system, uses 3-D ultrasound technology to perform precise, targeted prostate biopsies.

Gridlogix is a technology company whose middle-ware application facilitates sharing of data across proprietary information systems, commonly found in healthcare facilities such as hospitals.

ISTO Technologies is an orthobiologics company focused on developing breakthrough biologic products for orthopedic applications in sports medicine, spinal therapy, and trauma. The products are used to repair and regenerate damaged cartilage in knee joints and spinal discs.

Kereos develops targeted molecular imaging agents and therapeutics designed to detect and treat cancer and cardiovascular disease earlier and more specifically than currently possible, in ways potentially more effective and less toxic than current treatments like radiation.

Orion Genomics develops oncology diagnostic products for cancer screening and therapy selection.

Quick Study Radiology provides hospitals with electronic radiology imaging systems and archiving.

Mature medical device and imaging companies within the St. Louis region:

ADAC Medical Technologies
AG Industries
Allied Healthcare Products*
Back-Mueller
Bausch & Lomb*
BD Diagnostics Accu-Glass Division
bioMérieux
Coretech Holdings
Covidien*
Dyna Flex of Missouri
Essex Industries
General Physiotherapy
Global Surgical Corp.
Guard Industries
I V House
Invacare

Keller Laboratories*
Meridian Medical Technologies*
Micro Medical Instruments
NiTi Medical Technologies
Obtura Spartan
Phillips Medical Systems of North America
PSI/EYE-KO
Rhein Manufacturing
Siemens Medical Systems USA*
Steris*
Stereotaxis
Stryker Corp.
Synergetics*
The Respiratory Group
Young Innovations*

AmeriNet, Inc., the largest health care group purchasing association is headquartered in St. Louis. Amerinet controls costs and quality by reviewing health care equipment and supplies and negotiating discounts for its 1,000 members.

***100 or more employees in St. Louis**

“There are the obvious reasons why St. Louis has been attractive for healthcare startups – the five life sciences focused venture funds, the medical schools, the teaching hospitals, and the universities with over \$400 million-plus in NIH research conducted annually. But it’s the longer term competitive advantages, as mature companies, that keep them here. Companies can easily find entry-level job candidates trained by the community colleges, up through PhDs experienced in running clinical trials at Washington University.”

*-Frank Stokes, CEO of Innovate St. Louis
Medical Technology Investment Digest, Fall 2007*

The St. Louis Regional Chamber & Growth Association (RCGA) is the chamber of commerce and economic development organization for Greater St. Louis, which includes 16 counties in Missouri and Illinois. RCGA markets the St. Louis region nationally and internationally to attract targeted industries to the area. It further spurs economic development by aiding the expansion and startup of companies within the region.

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