



WHERE TECHNOLOGIES CONVERGE,  
OPPORTUNITIES EMERGE.

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ADVANCED MEDICAL TECHNOLOGIES IN RALEIGH/WAKE COUNTY, NC

➔ *Forbes* named Raleigh the nation's #1 Best Place for Business and Careers two years in a row.



## Piecing the Future Together

**Raleigh** continues its remarkable emergence as a global destination for technology jobs and investment. A legacy of economic transformation that began in the 1950s with the creation of Research Triangle Park now manifests itself in the presence of names like Red Hat, GlaxoSmithKline, SAS and Novartis. Our reputation as a center for Knowledge Age opportunity is built on a framework of collaboration between our research

universities, business friendly government and rapidly growing, well-educated population.

With the convergence of recent innovations in specialized materials, informatics, nanotechnology, biopharmaceuticals, surgical devices and other technology platforms, Advanced Medical Technologies (AMT) are set to become the region's next high growth cluster.

Raleigh's rise to AMT prominence mirrors North Carolina's impressive growth in the industry over recent years. AMT businesses employ about 7,200 statewide, a figure that represents solid, steady increases over the previous decade.

➔ The Milken Institute recently ranked Raleigh-Cary, NC the nation's #2 Best Performing City.

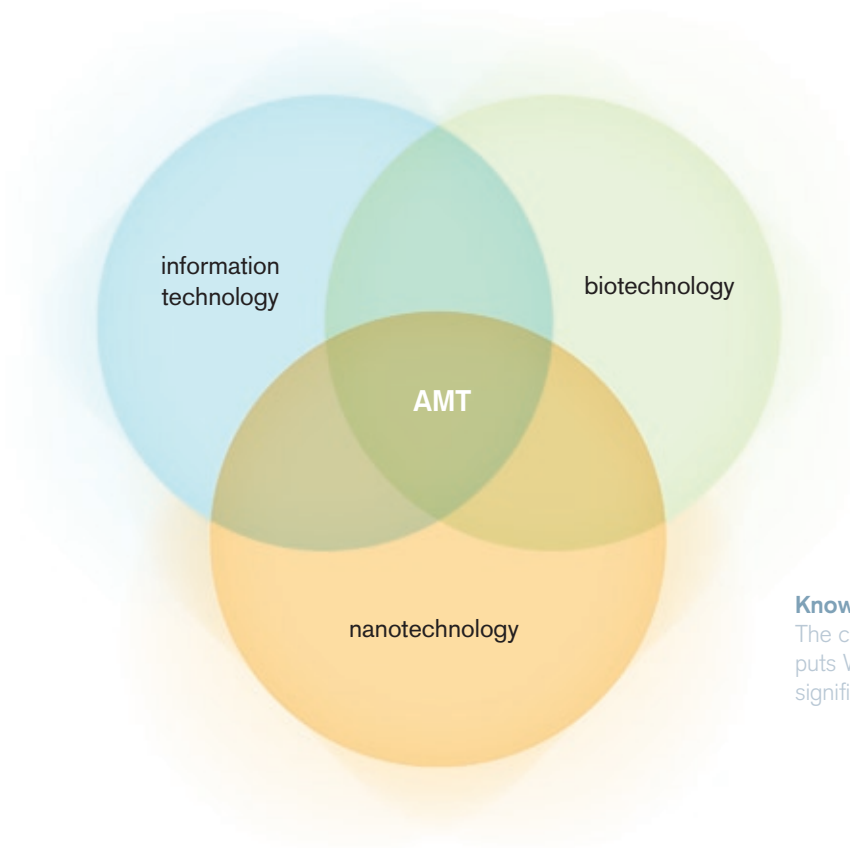
## Always Thinking Ahead

Wake County, part of the fabled technology community known as the Research Triangle, traces its leadership in the life sciences to the founding of the North Carolina Biotechnology Center by state legislators in 1984. Since then, the Center has invested about \$200 million in the state's life sciences infrastructure, support that has catapulted North Carolina into America's third leading biotechnology state. Much of that activity has occurred in the

Research Triangle Region, whose life sciences cluster accounts for most of the state's 55,000 jobs. Global industry giants such as GlaxoSmithKline, Novo Nordisk, Wyeth and Merck take their place among promising new names like AlphaVax, Inspire Pharmaceuticals and Biolex.

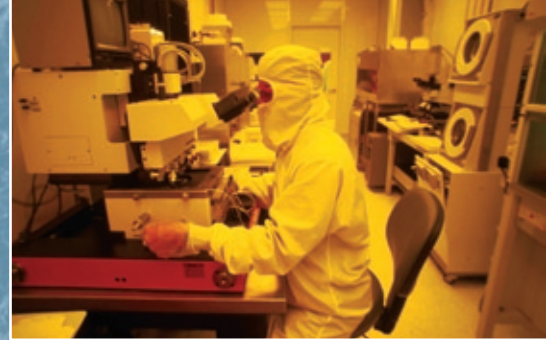
World-class research and technology transfer programs have long supported the success of the region's biotechnology

economy. Renowned universities—North Carolina State, UNC-Chapel Hill and Duke—extend a full spectrum of intellectual resources into the region's business community, including curricular programs, applied research facilities and outreach centers across every discipline.



### **Knowledge Overlapping**

The convergence of these technologies puts Wake County in a position to realize significant growth in the AMT industry.



The region's three major research universities—NC State, UNC, and Duke—combine to spend over \$1 billion annually on R&D.

# A Powerful Partner

At the heart of the region's support for the AMT industry is North Carolina State University. The 122-year-old campus fosters innovation and accelerates commercialization through its partnerships with industry, economic development organizations and government. NC State provides an array of valuable networking and educational opportunities that link AMT components, expertise and facilities. Here's a sample:

**Center for Chemical Toxicology Research and Pharmacokinetics**—a

research and training resource whose nanotoxicology program is assessing the nature of interactions between skin and manufactured nanoparticles;

**Center for Robotics and Intelligent Machines**—which pursues the integration of mechanical systems, information technologies and biotechnology innovations;

**NCSU Nanofabrication Facility**—a self-described “melting pot” of leading researchers from academia, government labs and industry R&D operations.

Overall, annual research spending at NC State now exceeds \$325 million. Many of its innovation-inducing partnerships occur on Centennial Campus, a 1,120-acre complex of academic buildings, labs and corporate offices. Nearby, the Centennial Biomedical Campus—anchored by the renowned College of Veterinary Medicine—is in the midst of a 20-year effort to construct 1.6 million square feet of wet-lab space, offices and animal care facilities.

# Campus Innovators in Every Direction

Complementing NC State's leadership in the region's AMT cluster is a formidable array of academic expertise and commercialization programs at other top research universities nearby.

Duke University, driven by a nearly \$6 billion endowment, is an international research powerhouse. Biomedical engineering programs at Duke consistently gather top national accolades, providing research and instruction that integrates engineering and biology disciplines to advance the detection and treatment of

human disease. Duke's School of Medicine, building on its strong global reputation in discovery science and clinical investigation, maintains active programs in animal, human subject and clinical research.

At the University of North Carolina at Chapel Hill (UNC), the nation's oldest public university, colleges of medicine and pharmacy undertake ambitious programs of research in addition to their obvious role in training generations of medical providers. Since 2003, UNC and NC State University have operated a Joint Department of

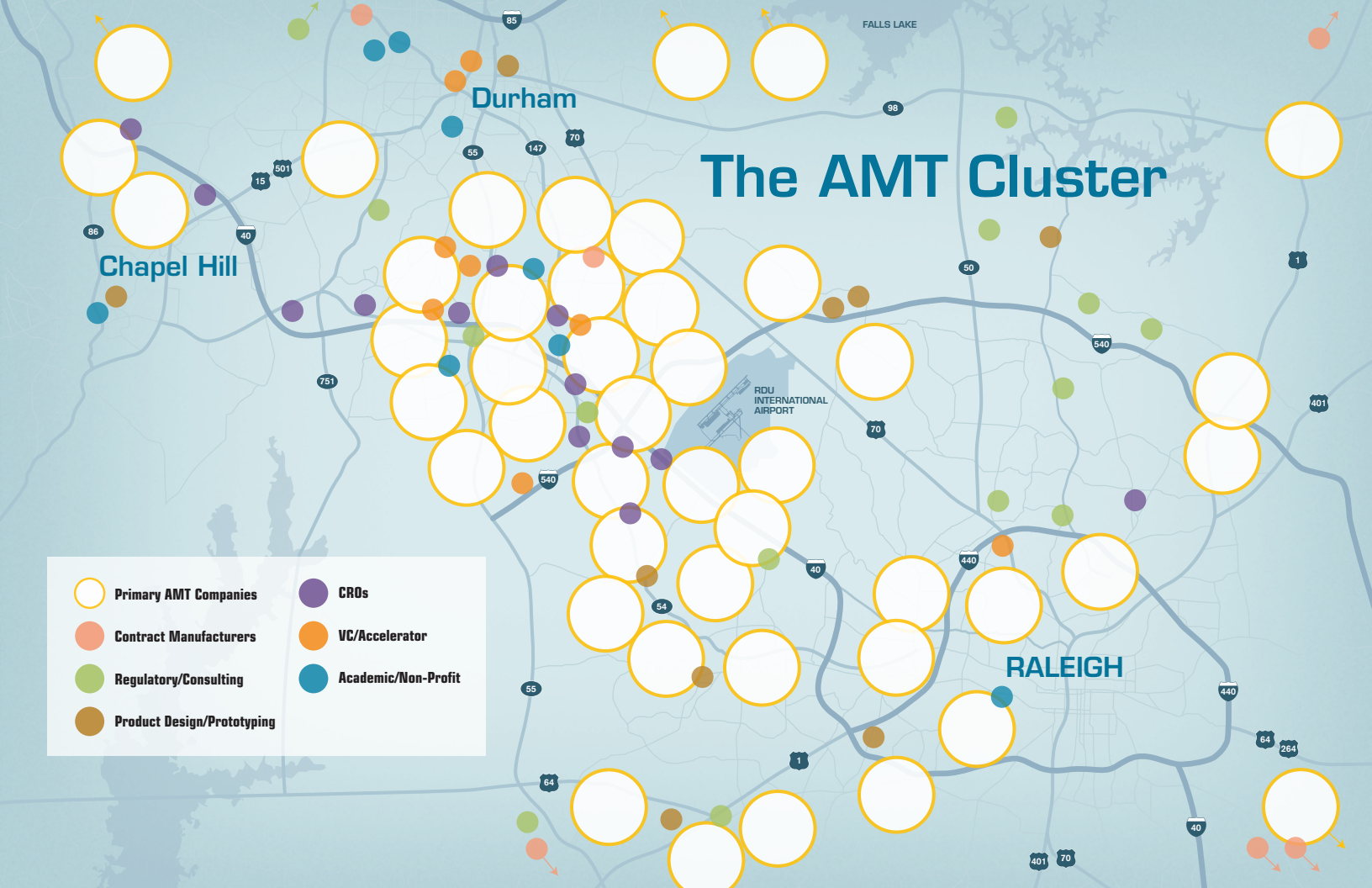
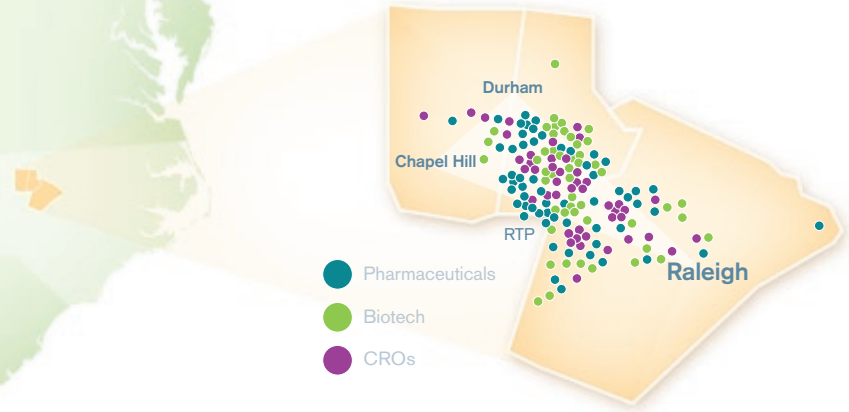
Biomedical Engineering that unites the expertise and resources of UNC's School of Medicine with those of NC State's College of Engineering. This unique department, which is co-located in Raleigh and Chapel Hill, offers MS and PhD degrees in Biomedical Engineering, in addition to a Graduate Certificate in Medical Devices and several undergraduate concentrations.

Wake County's AMT industry is further enhanced by a thriving life science cluster.

# Life Sciences in the Triangle

Investments in the state's life sciences infrastructure during the past quarter century, combined with a strong tradition of manufacturing, IT and healthcare, brings AMT opportunities to every corner of North Carolina.

The Research Triangle Region now takes its place alongside Boston, San Diego and San Francisco, as one of the nation's leading diversified biotechnology environments.



➔ Large firms nationwide have paid more than \$810 million to acquire North Carolina-based AMT companies.

## Product Life Cycle

A broad base of AMT expertise and support systems make Raleigh and Wake County the ideal home for companies at any stage in the product development life cycle.

## Concept and Prototyping

### Concept

As a land grant institution, one of NC State's responsibilities is to transfer technology from the university across the State of North Carolina. Because of this, NC State is an excellent place to go if you need access to specialized knowledge and facilities. This is especially true for advanced medical technology firms large and small.

Programs and infrastructure are in place in areas like Industrial Design, Biomedical Engineering, Advanced Materials, Robotics and others to help companies develop—and prove—new technologies.

### Prototyping

Now that you have an idea—possibly even drawings of your new product—what's next? Develop a prototype.

Rapid prototyping, typically performed using a technology known as stereolithography, will allow you to see, touch and feel how your new product will exist. These services are a critical step in the development of many new medical products. FineLine Prototyping, located in Raleigh, has become an industry leader in the development of precision parts—and precision is the name of the game in the AMT industry.

Raleigh-based FineLine Prototyping offers a microfluidic fabrication process that dramatically shortens prototype development time without sacrificing quality or detail.

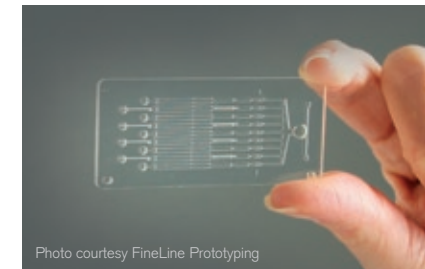


Photo courtesy FineLine Prototyping

➔ *Site Selection* magazine has named North Carolina the top business climate in the U.S. for seven of the last eight years.



## Pre-Clinical and Clinical Trials

### **Case Study: Sichel Technologies**

Sichel Technologies, co-founded by a Raleigh oncologist and a professor at NC State, developed an implantable sensor that enables clinicians to customize and measure radiation treatment delivered to tumors. When it was time to test the implantable device in pre-clinical trials, the company turned to the highly regarded

College of Veterinary Medicine at NC State. Sichel Technologies has since received FDA approval to market this innovative product.

### **Contract Research Organizations**

Wake County and the Research Triangle Region are home to the largest concentration of contract research organizations

in the world. A core function of these CROs is to provide assistance to AMT companies throughout the rigorous clinical trial process. With all of this readily available expertise, it is easy to see why Wake County is a leading location for advanced medical technology companies.

## Commercialization

### **Case Study: GlaxoSmithKline**

GlaxoSmithKline (GSK), with over 5,000 local employees, maintains its North American headquarters, a significant research and development center, and a major manufacturing facility all within 30 minutes of Raleigh. This major commitment to the region signifies that this is an excellent place for advanced medical technology companies to operate.

### **The ADVAIR DISKUS®**

GSK's ADVAIR DISKUS is a purple drug delivery device that contains the prescription drug ADVAIR®. The patient prepares the device for use by a simple rotation and inhales the drug with a deep breath. It is an excellent example of a combination product—the drug and the delivery device act as one.

### **GSK Chose Wake County**

GSK has close to 80 manufacturing sites worldwide—many of which have the ability to make the ADVAIR DISKUS. Yet this sophisticated product continues to be made in Wake County because of our excellent workforce, outstanding business climate and reasonable cost of doing business.



## High Caliber Living

In an industry reliant on steady supplies of talent, AMT firms find Raleigh a ready destination for creative workers and business professionals. With its youthful pulse, diversity and dynamic cultural scene, Raleigh welcomes new arrivals from around the world. Regionally, there is a wealth of social, recreational and commercial amenities that rival our big-city competitors. Raleigh's attractions include state museums of art, natural science and history, the North Carolina Symphony Orchestra, minor league baseball and NHL hockey, and a

year-round calendar of NCAA sporting events. But unlike some metro areas, Raleigh offers options for life and leisure that are affordable and accessible.

Greater Raleigh offers an eclectic range of living environments, from busy downtown neighborhoods and comfortable suburbs to placid rural communities. An equally diverse housing stock—from high-rise condos to sprawling farms—serves a broad array of tastes, budgets and household sizes. Wake County Public Schools are among the

nation's best-performing K-12 educational facilities, and the region is home to top-ranked private academies and independent schools.

A central location puts Wake County residents within easy reach of a world of other attractions. Pinehurst, the century-old golfing Mecca, is only an hour's drive south. Coastal North Carolina communities are two to three hours away. For those preferring highland destinations, the Blue Ridge Mountains are a half-day's drive west.

## Embrace the Possibilities

Technological innovations now coming together in Raleigh can help fuel your company's future. Explore the exciting possibilities with a visit to our website at [raleigh-wake.org](http://raleigh-wake.org).

Wake County Economic Development  
800 S. Salisbury Street  
Raleigh, NC 27601  
919-664-7000  
[ctucker@raleighchamber.org](mailto:ctucker@raleighchamber.org)





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