Charlotte's BIOSCIENCES

CHARLOTTE
CHAMBER ECONOMIC DEVELOPMENT

Bioscience Success

ONE INTERNATIONAL BIOSCIENTIST SAYS WE ARE IN "THE CENTURY OF BIOLOGY." CHARLOTTE BIOSCIENCE INNOVATORS ARE DEFINING THE CENTURY ALREADY TO CURE DISEASE, CLEANSE OUR CLIMATE, MANAGE GENETIC INFORMATION AND CHANGE MEDICAL PRACTICES — BUILDING BIOSCIENCE BRIDGES TO A HIGHER QUALITY OF LIFE.

What makes Charlotte a "bio-success"? The journal, Genetic Engineering and Biotech News, in the summer of 2009, cited six keys to bioscience victory. Charlotte hits them all.

- Experienced workforce
- Critical mass of expertise
- Access to capital
- Innovation
- Leaders experienced in all stages of development
- Diverse service provider community

Here's a sampling of Charlotte's "bio-success:"

A critical mass of expertise: Salvin Dental

Salvin Dental is a global leader in surgical instrumentation for Implant Dentistry. Bob Salvin says, "Dental Implants are gaining ground for medical and cosmetic reasons. People are living longer, working longer and want to maintain healthier lifestyles. I see oral health being increasingly recognized as one way to achieve better health. This is an exciting bioscience niche."

Their customers are more than 26,000 surgical specialists in more than 100 countries, specifically Oral Surgeons, Periodontists, Prosthodontists, and General Dentists who have taken advanced training to surgically place implants in their practice. For almost three decades Salvin has been the innovator behind devices now considered routine in this surgical niche: specifically bone grafting materials for implant site preparation, instruments and materials for sinus surgery, and overall specialized instrumentation to make surgeries easier and more predictable for both the surgeon and their patient.

> "Research has already established a strong association between poor oral health and heart disease, stroke and diabetes … Gum disease could influence brain function …"
>
> *~ ABC-TV News Health Report, November 12, 2009*

Salvin's comprehensive catalog has over 1,100 specialized instruments, osteobiologics and other products to serve this oral health discipline. Salvin doesn't work alone, instead he creates the ultimate network for innovation with his customers, who describe their surgical needs to Salvin, who then works his engineering, medical and machining system to match the best minds for the problem. Salvin introduces more than 50 new products each year on average.

A critical mass of expertise: MD Scientific

Shade M. Mecum, President and CEO, of MD Scientific cites the "world class hospital facilities and medical community" in Charlotte as a driver in bioscience success. The company developed one of the first therapeutic software tools used in hospitals. EndoTool® Glucose Management

> "Key trends in bioscience are to find drugs and intelligent medical systems to reduce healthcare costs. We have found a receptive medical community for innovation and the people resources to implement our vision."
>
> *— Shade Mecum, MD Scientific*

COVER PHOTO BY PATRICKSCHNEIDERPHOTO.COM

▲ Bob Salvin, CEO of Salvin Dental (center), discusses one of the many products the company sells with Greg Slayton, Vice President of Sales (left) and William Simmons, President.

System is an FDA-cleared system to calculate intravenous insulin dose for critically ill patients. MD Scientific sold this business to Hospira, Inc. in 2008.

MD Scientific has two patents issued for the reduction of renal failure in hospitals. One of the patented drug therapies is undergoing Phase III FDA Trials and is expected to go commercial in 2011 or 2012.

Leaders experienced in all stages of development: MedTech Catalyst, LLC

MedTech Catalyst, LLC, helps fill the gap between an idea and a medical product that is market-ready. By providing the management for early-stage enterprises, MedTech Catalyst offers physicians and academic medical centers the expertise to understand the business challenges and to nurture technology to eventual commercialization.

Specifically, MedTech Catalyst:

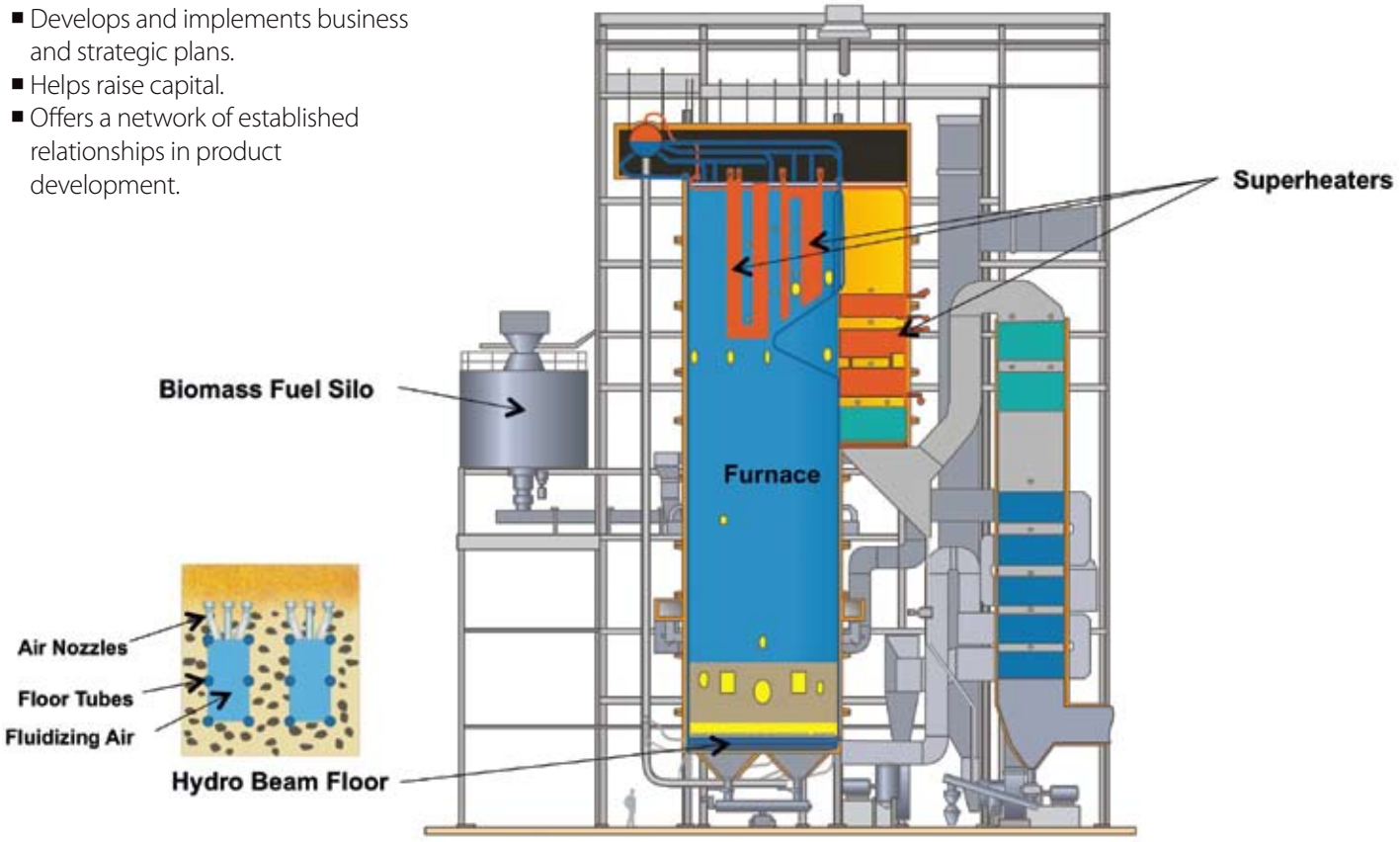
- Prepares healthcare products/devices for commercialization.
- Manages all aspects of early-stage companies — intellectual property strategy, prototype build, manufacturing, finance, regulatory issues and clinical trial management.
- Identifies and helps negotiate with strategic partners.

➤ The AngleFix T Locking Plate is indicated for temporary stabilization of certain long bone fractures. MedTech Catalyst, LLC founded AngleFix Tech, LLC, which raised capital, created the business plan and retained all the talent to translate the product from a paper-based idea to proof of concept including FDA clearance to market.

"Two excellent hospitals offer the possibility for clinical expertise to help refine medical ideas and the possibility to partner for clinical trials. Our strong university provides the opportunity to tap functional experts especially in mechanical, electrical and human factors engineering, and to test ideas on the bench prior to the expense of moving into the clinic."

— Michael Sinsheimer, MedTech Catalyst

- Develops and implements business and strategic plans.
- Helps raise capital.
- Offers a network of established relationships in product development.



▲ Bioscience meets energy production: Today, more than 170 Metso Power bubbling fluidized bed boilers and boiler conversions and more than 70 circulating fluidized bed boilers handle demanding biomass fuels. Fuels are burned in suspension of hot bed material consisting of sand, ash and additives. The sand effectively dries and ignites the fuel. Strong turbulence and good mixing result in high combustion efficiency and low emissions. Many of the world's largest biomass power plants use Metso technology.

Experienced workforce: Metso Power

Bioscience expertise is defined beyond the medical industry in Charlotte. In November 2009 a national clean energy contractor took on a 100 megawatt generating facility project in Texas. Said Biomass magazine, the "…partner for the engineering, supply, erection and commissioning of the biomass boiler and distributed control system is Metso Power, Charlotte, N.C. The biomass boiler plant will use bubbling fluidized bed technology and once operational, will be one of the largest and most efficient biomass boilers in the world." Metso is a forerunner in fluidized bed boilers for power plants for the combustion of biomass and other fuels.

A critical mass of expertise: UNC Charlotte

Significant strides have been made to fight breast cancer. Though traditional therapies improve and new therapies emerge, approximately 40 percent of patients fail current therapies and succumb to their disease. Further, metastatic breast cancer remains incurable.

Jennifer Curry, PhD, is post-doctoral research fellow at UNC Charlotte working under the supervision of Dr. Pinku Mukherjee. "We have an exciting approach to deliver compound drugs directly to the tumor site, which reduces side effects of systemic treatment." Research in the laboratory focuses on a specific protein, MUC1, whose expression is altered on 90 percent of human breast tumors and metastatic sites. "We have been able to elicit immune responses against tumor-associated MUC1 using a MUC1-specific vaccine. Unfortunately, the tumor creates an environment that inhibits tumor immunity." To circumvent this problem, Dr. Mukherjee's lab has attached compounds that block immune suppression to antibodies specific for tumor-associated MUC1.

Dr. Curry says, "It is our hypothesis that a combination of vaccine treatment with the delivery of immunosuppression inhibitors to the tumor will allow the immune system to kill MUC1-expressing tumor cells within the primary tumor and metastases."

Innovation: SoyMeds

SoyMeds is a research company focused on the development and validation of soybean seed-based therapeutics. A soybean seed-derived vaccine can address challenges associated with conventional vaccine production and distribution, such as storage, cold chain, high production costs and purification.

In the large beaker: transgenic soybeans harboring SoyMeds' pharmaceutical proteins. In the weigh boat: processed soy powder. In the small beaker: soy milk formulations that can be used for oral delivery of vaccines and toleragens. Soy-expressed analytes can be purified from soy milk and used in diagnostic assays.

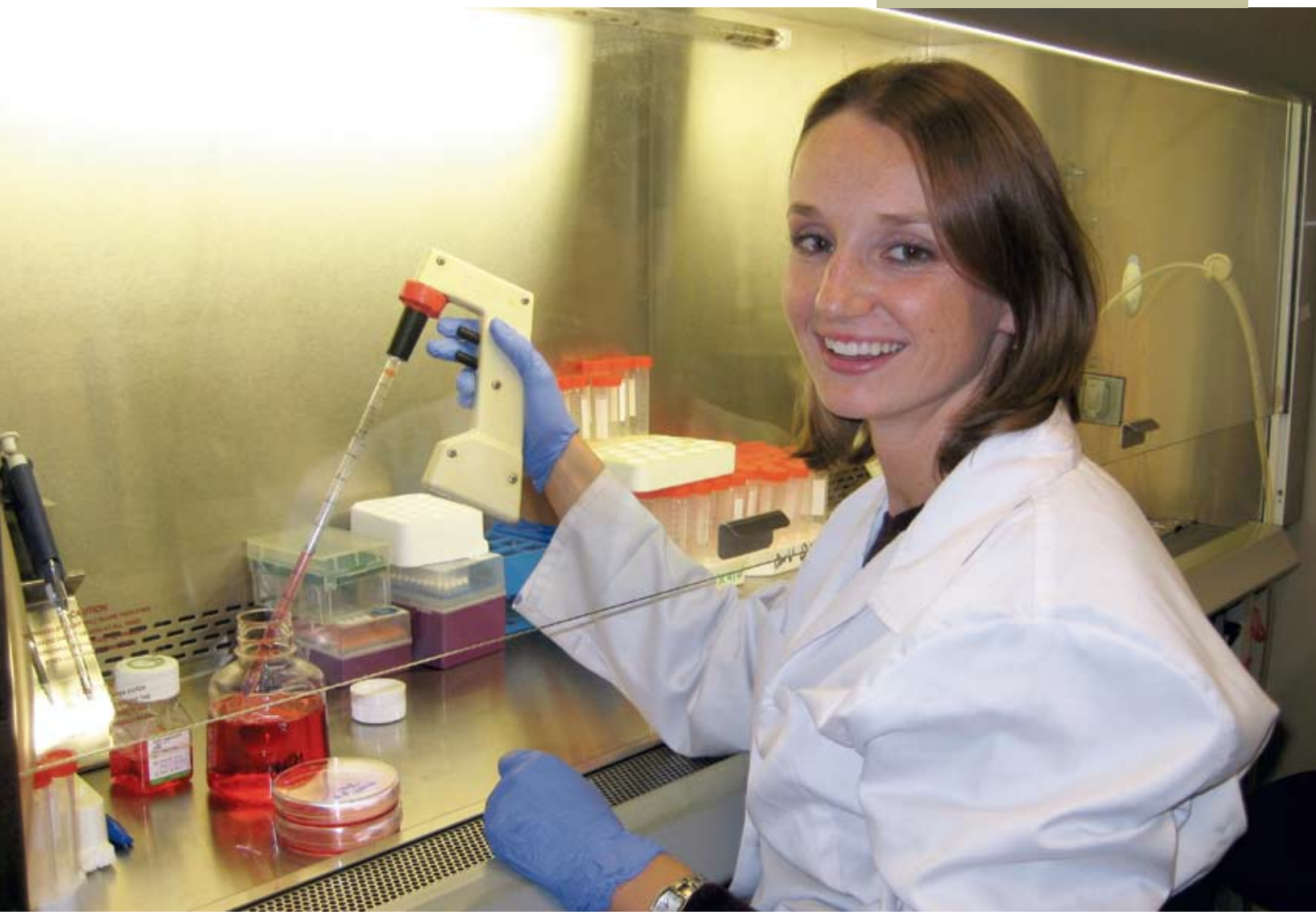
SoyMeds partners with manufacturing companies to produce, market, and sell, or provide licenses for partnerships. There are three key kinds of SoyMeds products:

- Vaccines: Administered orally as formulated soymilk, allowing the vaccine to be recognized by mucosal cells, stimulating protection from pathogens that invade mucosal surfaces.
- Toleragens: Also administered orally, toleragens limit immune responses — for example, those perpetuating autoimmune diseases and food allergies.
- Diagnostics: Many diagnostics on the market today are costly because they require harvesting from tissues or organs, or can be difficult or impossible to express. SoyMeds' analytical products offer significant cost and production advantages over current recombinant systems such as E. coli or tissue culture.

Innovation: Clear Collar

Charlotte companies make innovative differences in medical applications. The ClearCollar™ is a patented transparent cervical collar that allows first responders, doctors and nurses in the field to assess injuries without removing the cervical collar, reducing the risk of undetected injuries. Traditional cervical collars put the patient at risk of motion, which can result in severe cervical spine injuries, by repeatedly opening and closing the collar for inspection. The ClearCollar reduces these unnecessary risks, ensuring safer

Jennifer Curry, PhD



care for patients and reduced liability for the medical providers.

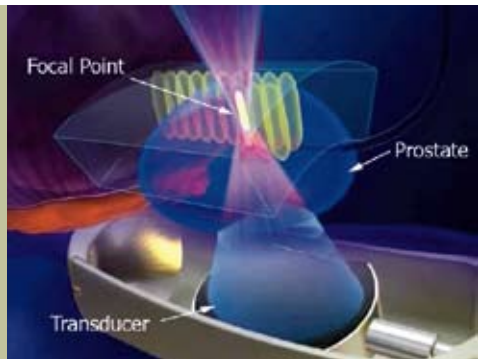
Developed by an emergency room nurse of more than 20 years, the ClearCollar has already been endorsed by doctors, nurses and medical professionals from across the country. The ClearCollar company begins manufacturing in Charlotte for national and international distribution in 2010.

BioConnect is an open, informal, non-profit regional group that fosters interaction between academia, industry, government agencies, trade, professional services and financial organizations in the life sciences and high technology disciplines in the greater Charlotte region. For information: www.ncbioconnect.com

Innovation: HIFU

US HIFU is a Charlotte firm pioneering ways to treat prostate cancer and other diseases with a technology that targets tissue in the body with ultrasound energy to destroy it. HIFU — High Intensity Focused Ultrasound — focuses sound waves in a targeted area which rapidly increases the temperature in the focal zone causing tissue destruction. CEO Steve Puckett, Jr. says that HIFU for prostate cancer is potentially a less expensive treatment option with a lower risk of side effects than traditional ways of treating prostate cancer, such as surgery and radiation. Typically, HIFU is a 1-4 hour,

➤ The Sonablate® 500 medical device (below) delivers ultrasound waves to diseased prostatic tissue. Extreme heat (190° F) at the focal zone destroys targeted tissue (diagram, right), but leaves surrounding healthy tissue intact, which can help preserve quality of life functionality such as sexual function and urinary continence.



one-time procedure performed on an outpatient basis under spinal anesthesia. The treatment is undergoing clinical trials for approval in the U.S.

A diverse service provider community

"Biosciences is emerging as a 'New Economy' bridge in Charlotte. Accomplished executives in varied tech fields are able to develop a deeper talent pool for biotech and medical expertise firms that locate here. My experience in executive recruiting says that our city provides the kind of broad-based management skills for a company that wants to grow," says Cynthia Carlson, Campbell/Carlson Executive Search.

A Positive Charge: Science Education in Charlotte Schools

Productive scientists emerge from positive education environments. Charlotte is recognized for its science education. Hopewell High biology teacher Cindy Rudolph won the Milken Educator Award for North Carolina in November 2009. The Milken Foundation identifies teachers who use innovative techniques and are a role model to students. Charlotte-Mecklenburg Schools' science director, Cindy Moss, is a prior recipient of the award.

As for those diverse skills, the K&L Gates' legal professionals provide a full range of disciplines important to emerging or established bioscience firms, such as corporate and securities law, intellectual property protection, regulatory compliance, antitrust, litigation, employment law, executive benefits, real estate and tax law.

Says Mark Busch, Partner, "Increasing globalization of the industry, international connectivity and a burgeoning regulatory environment provide challenges, but also bring opportunities for companies in Charlotte. A face-to-face relationship is critical for counseling the diverse stages of a life sciences company's life cycle." K&L Gates services include early-stage financing, strategic alliances, in and out technology transfer transactions, research collaborations, portfolio exploitation, private and public financings and patent asset enforcement.

Access to capital

Charlotte's status as the nation's second center for banking provides financial acumen for bioscience firms. Beyond that, other sources of funds are available.

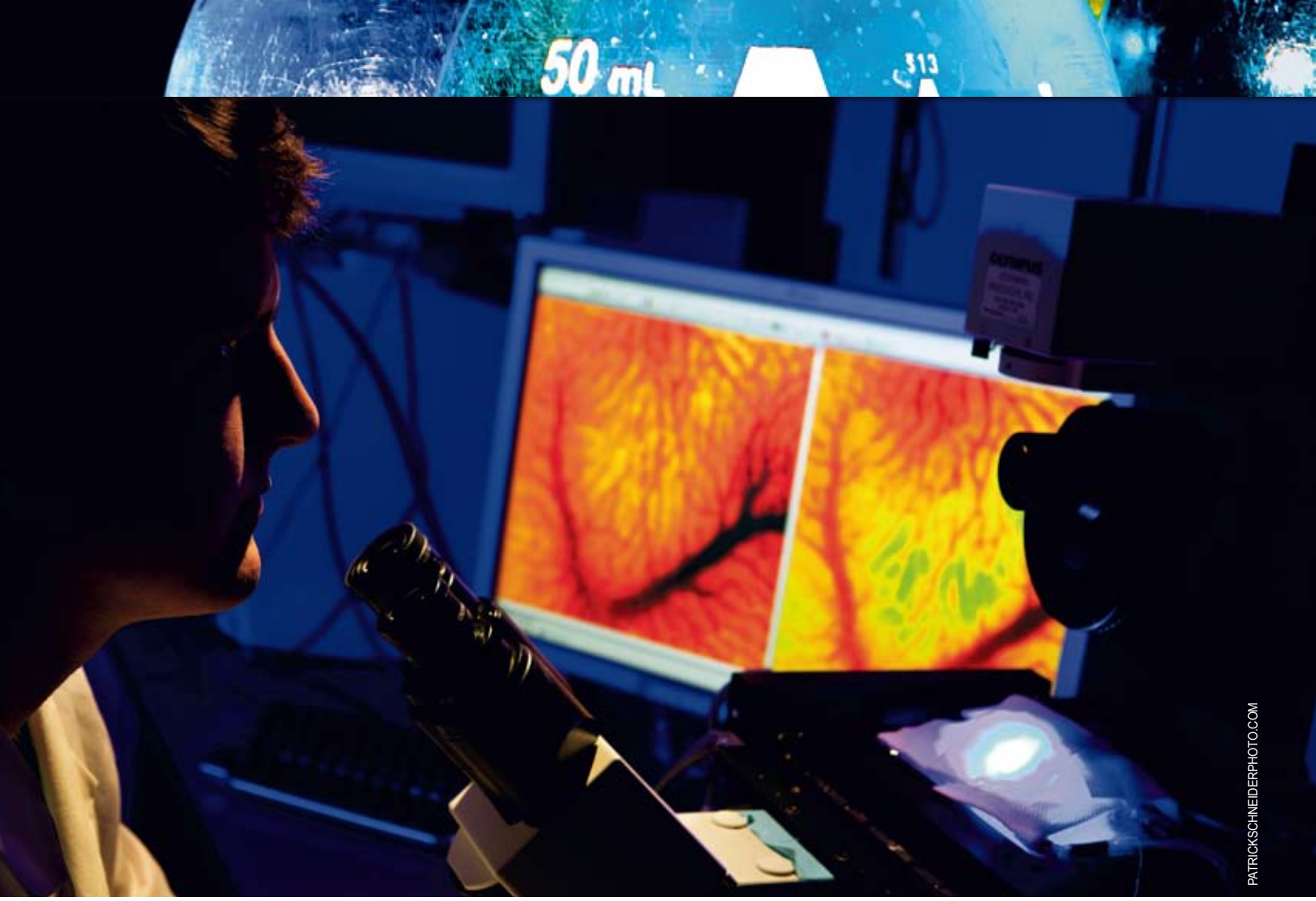
For example, the Inception Micro Angel Fund of Charlotte (IMAF-Charlotte) focuses on early-stage high-growth companies in the pharmaceutical, medical device, diagnostics, software and advanced materials sectors. IMAF-Charlotte is a member-managed fund that fills a critical funding gap at the seed-stage level between $50-$500K.

Ken Paulus is Director of IMAF-Charlotte: "We feel that the Charlotte region's life sciences growth curve is just beginning. North Carolina is a magnet state for bioscience executive talent. The University of North Carolina system and its researchers attract SBIR/STTR grants that also support the development of early stage companies. Our goal is to leverage opportunities produced at campuses and the private sector."

~ Scott Carlberg

"Our region is creating a new subsector of biotech through the integration of health, ag and nutritional research. The already robust bioscience footprint in Charlotte will evolve nicely as it intersects other core competencies in the region — engineering, nanoscience, informatics, photonics, energy and defense."

~ Margie Benbow, Director for Greater Charlotte Office, NC Biotech Center



Background and Methodology

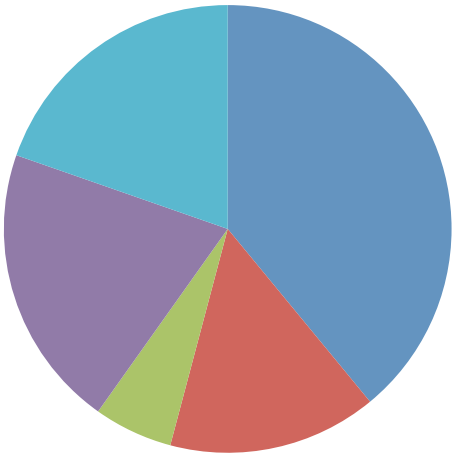
Historically, the Charlotte Region has played a supporting role for many of the industry sectors in North Carolina, providing jobs in commerce, distribution and finance. These industries have assisted in the growth of many other North Carolina companies by providing necessary support of their operations. The nature of the economy is changing and in order to keep up with these changes, the Charlotte Region and the state must modify the way they move forward. In order to continue as a competitive and supporting region, additional focus needs to be placed on industries other than the financial and manufacturing sectors for which Charlotte has been historically known. Biotechnology and bioscience are at the forefront of these industries as they play a crucial part in the technological advancement and future economy of an area.

In June 2008, The Charlotte Chamber of Commerce was awarded a $50,000 regional development grant from the North Carolina Biotechnology Center to create an inventory of the biotech assets within the Charlotte Region. By developing such a piece through detailed research and shared guidelines with the North Carolina Biotechnology Center, the Charlotte Region now has an economic development tool that will better unite the state in its quest for both biotech development and job growth.

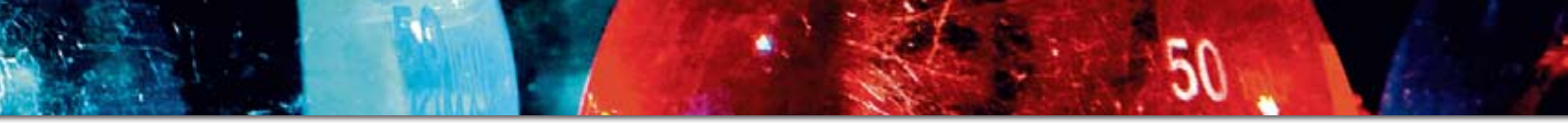
The project was managed by the Charlotte Chamber, partnering with Central Piedmont Community College, UNC Charlotte and the Charlotte Regional Partnership for data collection. This publication showcases an analysis of the results as well as interviews with several of the companies included in the study. The asset inventory has been constructed into a database that has been saved on the disc included within this piece.

Creating an asset inventory of the biotech, bioscience and bio-related industries in the Charlotte Region has given economic developers the tool to grow the region's biotechnology sector. Expansion in the sector will portray the Charlotte Region

Medical device and equipment companies are the most prevalent in the Charlotte Region.



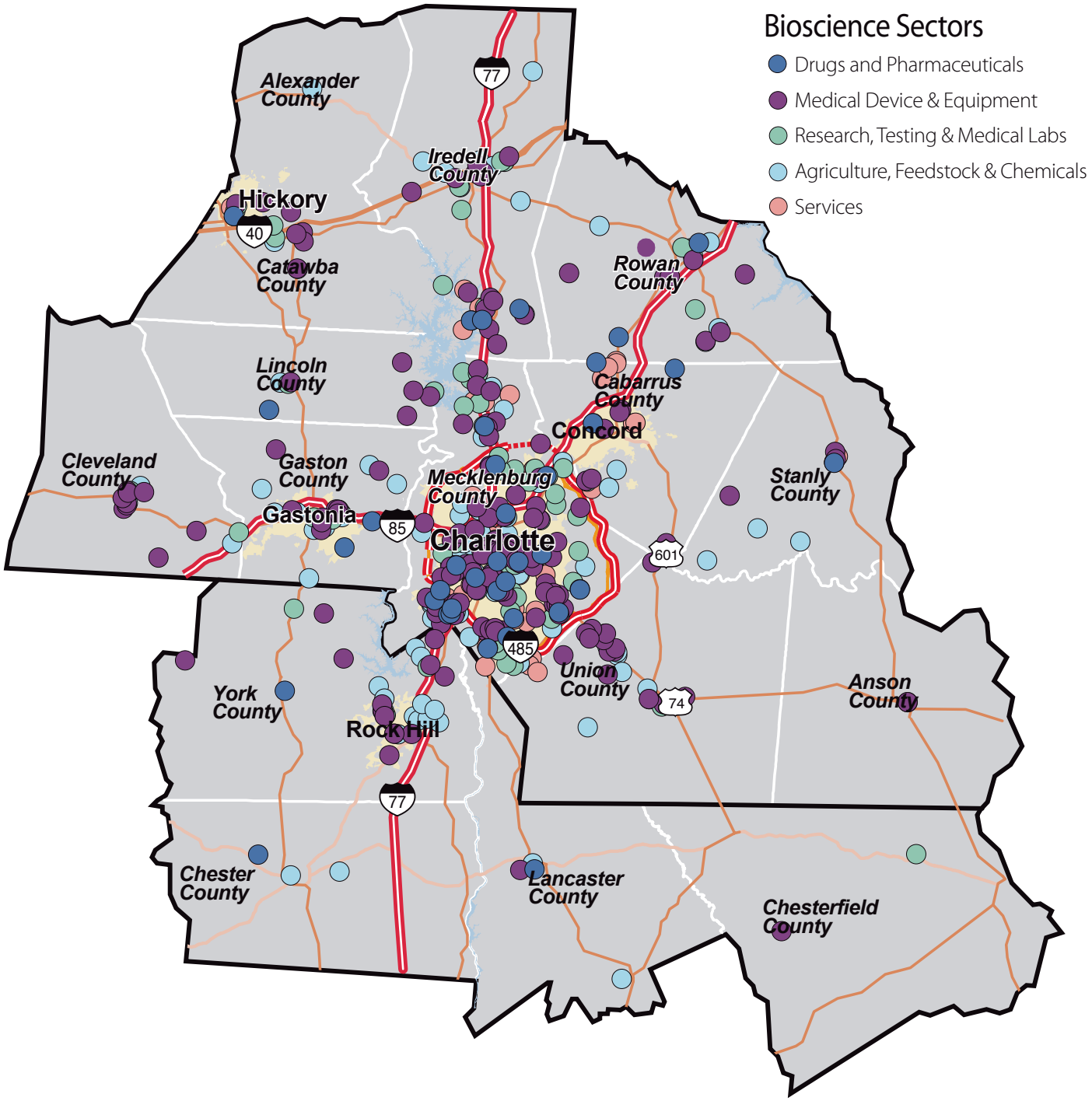
Medical Devices & Equipment	274
Research, Testing, Medical Labs	106
Drugs & Pharmaceuticals	40
Agriculture, Feedstock & Chemicals	144
Services	138



Bioscience Companies

Asset Inventory, Charlotte Region

759 companies



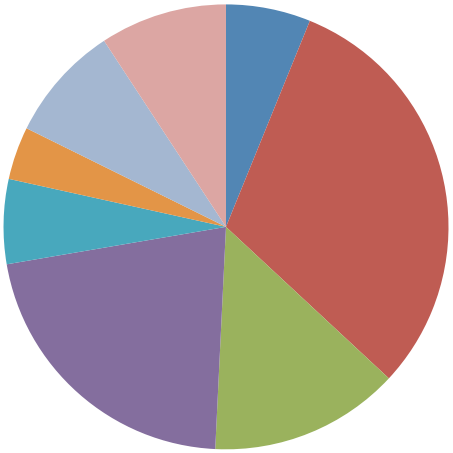
charlotte CHAMBER

as an advanced and competitive area beyond the traditional industries for which it is already known. Having a detailed asset inventory readily available for the Charlotte Region will demonstrate its strong suits within the biotech arena, highlighting its attractiveness to companies looking to relocate, expand or start anew. Including not only the biotech companies within the asset inventory, but also the bioscience and bio-related companies surrounding them, will be advantageous. Businesses will be able to observe the already existing industry structure and feel at ease knowing that their needs as a company can be fully be met.

Findings

The asset inventory study produced a total of 759 companies within the biosciences realm. The companies were separated into different sectors to better assess the make-up of the bioscience industry in the Charlotte Region. The categories included Medical Devices and Equipment; Research, Testing, Medical Labs; Drug and Pharmaceuticals; Agriculture, Feedstock & Chemicals and Services. The types of companies the asset inventory is comprised of are those considered biotech, life science, bioscience, ancillary companies, and also services. The ancillary companies can be defined as those that provide services biotech and bioscience companies need in order to function i.e. sterilization companies. The additional services sector is those companies that also assist within the biotechnology realm but in a different way. These include companies such as patent lawyers, venture capitalists and staffing companies. In order to be included within the study, these types of service-oriented businesses had to be very involved in the bioscience sector.

The services sector within the bioscience industry is comprised mostly of Patent Lawyers and Venture Capitalists.



Architecture Firms	8
Attorneys	40
Business Consulting Services	18
Capital	28
Computer Services	8
Engineering Services	5
Real Estate and Construction	11
Staffing Services	12

The complete database is included on the CD.

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Life & Physical Science Employees in the Charlotte Region

Occupation	Employees	Average Hourly Wage
Food Scientists	60	$23.44
Microbiologists	30	21.78
Conservation Scientists	50	24.17
Foresters	60	30.35
Epidemiologists	20	31.24
Medical Scientists	140	40.10
Chemists	520	33.16
Materials Scientists	110	32.35
Environmental Scientists	640	25.01
Biological Technicians	80	16.50
Chemical Technicians	600	19.25
Environmental Science Technicians	250	18.95
Forensic Science Technicians	100	22.66
Forest & Conservation Technicians	60	18.14
Life, Physical & Social Science Technicians	160	18.82
Total all Occupations	**6,180**	**$27.30**

Source: NC Employment Security Commission, 2009

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Marketing: Andrea Ware

BOOM,

just like that, it hits you. You are responsible for choosing the right location for your company. You look at the stack of information on your desk from so many communities and realize there are many options. You need to find a location that offers all the right ingredients for your company's success. It has to be a place with superior air service, skilled labor, an exceptional but affordable quality of life for your employees, and most importantly — a reasonable cost of doing business. All of a sudden, one community stands out. Welcome to Charlotte.

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