Charleston Metro
Chamber of Commerce

Driving growth. Defining tomorrow.

Creating a Comprehensive Research University in the Charleston Region

ISSUES TO CONSIDER

a White Paper
November 2013

Creating a Comprehensive Research University in the Charleston Region

Introduction:

In recent months, there have been a series of meetings and discussions with key leaders in the Charleston region, in conjunction with the College of Charleston and Medical University of South Carolina on how to expand the graduate degree offerings in the Charleston region. The Charleston Metro Chamber of Commerce has been a part of these discussions and has helped to organize a series of meetings with both the College and MUSC over the summer to discuss the region's workforce needs. The Chamber was asked to develop a white paper outlining the issue from the business community's perspective. This white paper is the compilation of both research and discussions with area employers over several years.

November, 2013

Transforming the Region's Economy

During the past two decades, the economy of the Charleston region has undergone a significant shift from a military/defense-dependent economy to one now more diversified and anchored around the activities of the Port of Charleston, the multi-billion dollar visitor industry, the healthcare industry, a growing and substantial manufacturing sector and the military. The region's quality of life, history and cultural amenities continue to attract new residents of all ages, helping to fuel the real estate and development industry as well.

Accolades for Greater Charleston keep coming with rankings and articles touting the region's great business climate, economic and job growth, and recognition as a world class visitor destination. The region was recognized for its growth in the manufacturing sector and for outpacing most areas of the United States for economic growth.

Our region is now in direct competition with communities around the world. It competes vis-à-vis these regions for business and talent and is now a global economic player. The Boeing Company's decision to build the 787 Assembly Operation in North Charleston has created more than 6,000 manufacturing production and engineering jobs locally in the past four years. In April, Boeing announced it would invest an additional $1 billion in their North Charleston facility. Through their acquisition in recent months of additional property, the announced capital investment, and specific commitments to build an IT Center of Excellence and an engineering design center in the area, there is no question Boeing intends to expand its South Carolina presence and will continue to grow in the region for many years to come. The single largest expansion and sustainability challenge facing the region is how to provide the skilled pipeline of qualified local workers to meet Boeing, Boeing's suppliers and related businesses going forward.

The region has unprecedented opportunity ahead and can have significant economic growth if it can meet the demands of a myriad of employers that are in rapid growth modes. Employers in every sector – particularly those in manufacturing and IT – will require a growing pool of qualified, highly educated workers. We can no longer afford to graduate mediocre levels of high school students. High school graduation rates must be significantly improved and the region must grow the pool of high school graduates with interests in STEM* related-fields. Once these qualified high school graduates matriculate they must be able to access a four-year public research university to pursue the degrees required by our burgeoning growth sectors.

A recently released study by Brookings' Metropolitan Policy Program on STEM jobs in the U.S. states that "innovation – primarily through the invention, development and profusion of new technologies – is the fundamental source of economic progress. Technological innovation... usually requires the expertise of specialists with knowledge in STEM fields". Brookings also notes that "the professional STEM economy of today is closely linked to graduate school education" and "maintains close links with research universities." Further, the study notes that between 2000 and 2003, 94% of the U.S. patent inventors held a university degree, with 45% a Ph.D.

*Science, Technology, Engineering, Mathematics

Businesses will also need local sources of invention and knowledge generated by colleges and universities to bolster competitiveness. Higher education will be pivotal in advancing economic growth. Without the knowledge gained through higher education, individuals will not be able to progress in the increasingly challenging global economy. Today, the Charleston region lacks the degree programs in the areas that are of highest demand.

The Metropolitan Revolution[1] cites the fact that going back into the nineteenth century, the most famous entrepreneurs and inventors in our country all had engineering backgrounds. "Innovation is closely intertwined with new developments in science and technology, either breakthroughs that create entirely new systems or products or new applications of existing technology…As technology becomes increasingly more sophisticated, engineering and other highly advanced degrees will be required to continually further innovations in niche fields."

The region must find a way to significantly expand the undergraduate, graduate and advanced degree offerings in the areas of most demand – engineering, IT and computer technology – if it wants to build a strong economy for the future. We have the ability to position the region as a world leader in the development of composite technology and manufacturing, aerospace, energy systems and IT/cyber/software but we cannot achieve that goal without robust graduate and post graduate offerings. Without the advanced degree programs, the region will settle for production-type jobs, not those in research and development and design.

The annual Charleston Regional Economic Scorecard benchmarks the region's economic performance compared to five peer metros, as well as two of the nation's leading metros for economic growth – Austin, Texas and Raleigh, North Carolina. The Scorecard will release its fourth annual report in October 2013. In every category measured over the past three years, Austin and Raleigh has outperformed the Charleston region as well as each of the other benchmark communities.

The major difference between Austin and Raleigh and the other communities is the presence of major comprehensive research universities which have been driving unprecedented economic growth in both metros for decades.

The region must find a way to significantly expand the undergraduate, graduate and advanced degree offerings in the areas of most demand – engineering, IT and computer technology – if it wants to build a strong economy for the future.
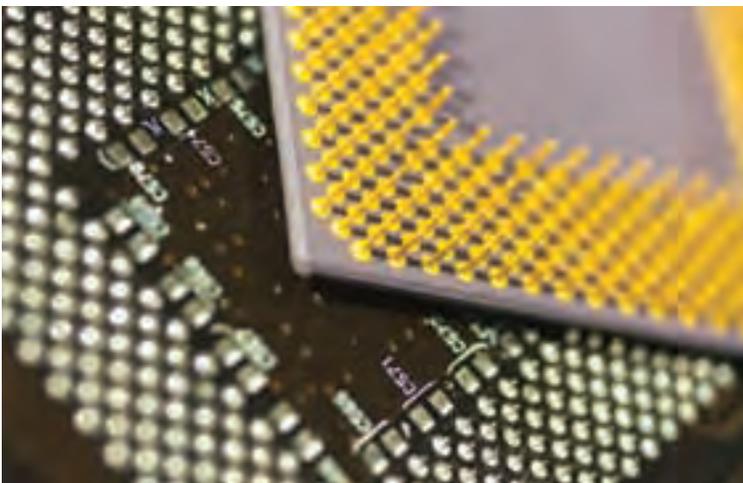
1. Bruce Katz and Jennifer Bradley, The Metropolitan Revolution: How Cities and Metros Are Fixing Our Broken Politics and Fragile Economy (Brookings Institution Press, 2013).

An economic impact study of the region's publically supported higher education institutions was released in April 2013. *The study, conducted for the Charleston Regional Development Alliance, cited the lack of a comprehensive research institution as one of the top challenges facing the region. The study states the lack of such a school "limits certain research funding opportunities and degree programs offered."*

A number of comprehensive surveys of the business community conducted since 2008 demonstrate the need to address higher education gaps and the region's resulting inability to provide degreed employee candidates in a series of high demand professional fields. *There is a clear lack of skilled, available talent in IT software, engineering and science fields to meet current and future needs. While the region has more than 25 public, private and for-profit institutions of higher education, there is a clear lack of degrees in undergraduate and graduate levels in these important demand fields.* This growing unfulfilled need is placing our region at a competitive disadvantage in being able to respond to employers currently attempting to expand, and in attracting dynamic, sustainable high-growth businesses to our market.

In 2008, a study of the region's employers found the most difficult jobs to fill included:
1. *Engineers*
2. *Sales*
3. *Information Technology*
   (computer programmers, software developers, IT)

In 2010, during the recession, Opportunity Next surveyed area employers on jobs for which they would be hiring in the next five years. Among the more than 5,000 potential new jobs to be filled:
- *640 Information Technology jobs*
- *584 Engineering jobs*
- *347 Computer programmers*

31% of the prospective new jobs envisioned were in areas our region is poorly positioned to fill.

Opportunity Next also identified the skills needed to grow the region's clusters (Aerospace, Bioscience, Advanced Security/IT and Energy Systems). All four clusters will demand the following jobs:
- *Engineering*
- *Computer/Software Engineering*
- *Information Technology*

The study also points out the region's weakness to successfully develop each of these clusters to their highest potential.

Opportunity Next specifically cites the "lack of higher ed programs and R&D and the lack of graduate engineering and computer science programs" as weaknesses for the region in fully developing both the Aerospace and Advanced Security/IT clusters. The report also recommends "expanding engineering and advanced materials programs at the R&D/university levels" as the region's solution to this issue.

The recent announcement by Boeing to add engineering and IT functions to its complex in North Charleston points to an increasing need for the region to find a way to fill these gaps. Boeing will relocate the needed workforce to fill these new jobs because the region does not have an existing pool of skilled workers to meet their needs. Last year, the College of Charleston's Computer Science program awarded only 41 undergraduate degrees. Our region is positioned for solid economic growth in multiple business sectors if we can provide the level of highly skilled workers to meet employer demands. While there remains a plentiful supply of workers in non-technical backgrounds, the demand for technically skilled employees, particularly in engineering and computer/IT will escalate rapidly. *The need for a comprehensive research university has never been more urgent.*
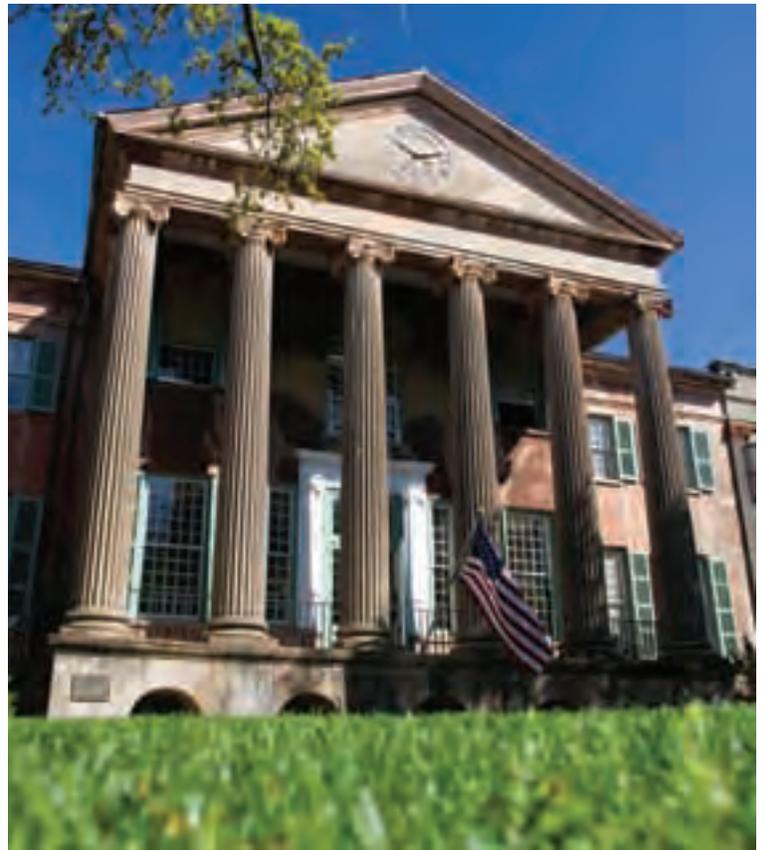
Skill Set	Cluster				Competency				
	Advanced Security & IT	Aerospace	Biomedical	Wind Energy	Advanced Materials	Creative Design	Drivetrain	Logistics	Software
Technical Project Management	X								
Information Assurance	X							X	X
Homeland Defense	X							X	X
Engineering:	X	X	X	X	X	X	X	X	X
Aerospace Engineering		X		X	X		X		
Systems Engineering	X	X		X	X		X	X	
Materials Engineering	X	X	X	X	X		X		
Electrical Engineering	X	X	X	X	X		X	X	
Mechanical Engineering	X	X	X	X	X		X	X	
Computer / Software Engineering	X	X	X	X	X	X	X	X	X
Information Technology / Networking	X	X	X	X	X	X	X	X	X
Defense Acquisition	X								
Electronics	X	X	X	X	X		X	X	X
Mechatronics, Machinists	X	X		X	X		X	X	
Robotics		X	X	X	X	X	X	X	X
Skilled Crafts		X		X			X	X	
Wind Energy & Turbine Technician		X		X	X		X		X
Composites Handling, Fabrication		X	X	X	X			X	X
Design & Product Conceptualization	X	X	X	X	X	X	X		X

Employer Survey of Higher Education Needs

The Chamber contacted a dozen area employers representing the manufacturing, computer/IT and healthcare sectors in June 2013 and asked them to provide specific information on their hiring plans and higher education needs over the next two to three years. Ten employers completed the short survey representing 19,300 full time employees.

The following occupations were most often cited as those needed in the next two to three years:

Accounting
Assemblers and Fabricators
Computer Engineer
Computer Programmer
Electrical Engineer
Electrician, Manufacturing
Engineering Technician
Finance
IT Support
Mechanical Engineer
Network/IT Administrator
Operations Manager/Supervisor

Employers indicated the majority of their hires would require a certificate, Associate's degree or Bachelor's degree. *Half indicated they would hire occupations requiring a Master's or Ph.D.*

Employers were asked what specific degrees they will be hiring from outside the region because they are not available locally:

- *Aeronautical Engineers*
- *Chemical Engineers*
- *Computer Science*
- *Electrical/Electronic Engineers*
- *Electrical/Computer Engineers*
- *Software Engineers*

Employers were asked to describe their greatest need/challenge today regarding the region's capacity to provide Bachelor's, Master's and Ph.D. degree graduates:

"Ability to obtain qualified number of engineering / IT resources in the next 2-3 years."

"Finding the advanced degrees locally is not likely."

"The way I interpret this question is do we need other Bachelor's, Master's or Ph.D. programs to continue staying competitive with the growing tech community in Charleston? The answer is yes. The programs in Charleston have to stay agile to adapt to the newest trends...this is the hardest challenge of our existing culture in Charleston."

"Lack of diverse technical degrees available."

"Engineering (manufacturing, mechanical, electrical, software and controls)."

A Comparison of Charleston to Leading Metros

Charleston is one of the fastest growing mid size metros for software industries and occupations*:

- Top 10 fastest growing software development region in U.S.
- Top 10 fastest growing mid-size metro for computer hardware engineers (#1), computer research scientists (#2), statisticians (#3), computer operators (#3), graphic designers (#5), computer programmers (#8), and electrical engineers (#10)
- Fourth highest per capita concentration in U.S. for computer research scientists and #7th for computer hardware engineers

From 2000 to 2010, according to the U.S. Bureau of Labor Statistics, *IT/Math occupations in the region grew by 62.3%, compared to the national average of 12%.* **Architect/Engineering occupations grew by 68% while the growth rate nationally was less than10%.**

In the last 24 months, we have had more than 3,000 new jobs in computer/IT/engineering announced in the region.

(Out of 125 mid-sized metros, 2006-2009).
Source: Avalanche Consulting Headlight Data System

The majority of the nation's 100 top metro regions have either a research institution or accredited engineering program, according to the Chamber's research, placing the Charleston region at a competitive disadvantage when competing with other areas for talent and economic development.

The next two pages highlight the nations top 100 metro regions and provides a full list of their research institutions or accredited engineering programs in order to emphasise the overwhelming need for the Charleston region to establish a Comprehensive Research University.

Top 100 Metro Areas	Comprehensive Research Institution	Aerospace / Aeronautical / Astronautical Engineering	Biomedical / Bioengineering	Computer Engineering	Electrical / Electronic / Communications Engineering
Akron, OH	✓		✓	✓	✓
Albany-Schenectady-Troy, NY	✓	✓	✓	✓	✓
Albuquerque, NM	✓				✓
Allentown-Bethlehem-Easton, PA-NJ	✓			✓	✓
Atlanta-Sandy Springs-Marietta, GA	✓	✓	✓	✓	✓
Augusta-Richmond County, GA-SC					
Austin-Round Rock-San Marcos, TX	✓	✓	✓	✓	✓
Bakersfield-Delano, CA					
Baltimore-Towson, MD	✓		✓	✓	✓
Baton Rouge, LA	✓				✓
Birmingham-Hoover, AL	✓		✓	✓	
Boise City-Nampa, ID					✓
Boston-Cambridge-Quincy, MA-NH	✓	✓	✓	✓	✓
Bridgeport-Stamford-Norwalk, CT					
Buffalo-Niagara Falls, NY	✓				✓
Cape Coral-Fort Myers, FL					
Charleston-North Charleston-Summerville, SC					
Charlotte-Gastonia-Rock Hill, NC-SC					✓
Chattanooga, TN-GA					
Chicago-Naperville-Joliet, IL-IN-WI	✓	✓	✓	✓	✓
Cincinnati-Middletown, OH-KY-IN	✓	✓	✓	✓	✓
Cleveland-Elyria-Mentor, OH	✓	✓	✓	✓	✓
Colorado Springs, CO					✓
Columbia, SC	✓		✓	✓	✓
Columbus, OH	✓	✓	✓	✓	✓
Dallas-Fort Worth-Arlington, TX	✓			✓	✓
Dayton, OH	✓	✓	✓	✓	✓
Denver-Aurora-Broomfield, CO	✓			✓	✓
Des Moines-West Des Moines, IA					
Detroit-Warren-Livonia, MI	✓	✓	✓	✓	✓
El Paso, TX	✓			✓	✓
Fresno, CA					
Grand Rapids-Wyoming, MI					
Greensboro-High Point, NC	✓				✓
Greenville-Mouldin-Easley, SC	✓		✓	✓	✓
Harrisburg-Carlisle, PA					
Hartford-West Hartford-East Hartford, CT					✓
Honolulu, HI	✓				✓
Houston-Sugar Land-Baytown, TX	✓	✓	✓	✓	✓
Indianapolis-Carmel, IN	✓	✓	✓	✓	✓
Jackson, MS	✓				
Jacksonville, FL					
Kansas City, MO-KS	✓				✓
Knoxville, TN	✓	✓	✓	✓	✓
Lakeland-Winter Haven, FL					
Lancaster, PA					
Las Vegas-Paradise, NV	✓				✓
Little Rock-North Little Rock-Conway, AR					
Los Angeles- Long Beach- Santa Ana, CA	✓	✓	✓	✓	✓
Louisville-Jefferson County, KY-IN	✓			✓	✓
Madison, WI	✓		✓	✓	✓
McAllen-Edinburg-Mission, TX					

Top 100 Metro Areas	Comprehensive Research Institution	Aerospace / Aeronautical / Astronautical Engineering	Biomedical / Bioengineering	Computer Engineering	Electrical / Electronic / Communications Engineering
Memphis, TN-MS-AR	✓		✓	✓	✓
Miami-Fort Lauderdale-Pompano Beach, FL	✓		✓	✓	✓
Milwaukee-Waukesha-West Allis, WI	✓		✓	✓	✓
Minneapolis-St. Paul-Bloomington, MN-WI	✓	✓	✓	✓	✓
Modesto, CA					
Nashville-Davidson--Murfreesboro--Franklin, TN	✓		✓	✓	✓
New Haven-Milford, CT	✓		✓		✓
New Orleans-Metairie-Kenner, LA	✓		✓		✓
New York-Northern New Jersey-Long Island, NY-NJ-PA	✓		✓	✓	✓
North Port-Bradenton-Sarasota, FL					
Ogden-Clearfield, UT					
Oklahoma City, OK					✓
Omaha-Council Bluffs, NE-IA					
Orlando-Kissimmee-Sanford, FL	✓			✓	✓
Oxnard-Thousand Oaks-Ventura, CA					✓
Palm Bay-Melbourne-Titusville, FL	✓	✓		✓	✓
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	✓		✓	✓	✓
Phoenix-Mesa-Glendale, AZ					✓
Pittsburgh, PA	✓		✓	✓	✓
Portland-Vancouver-Hillsboro, OR-WA	✓			✓	✓
Poughkeepsie-Newburgh-Middletown, NY					
Providence-New Bedford-Fall River, RI-MA	✓		✓	✓	✓
Provo-Orem, UT	✓				
Raleigh-Cary, NC	✓	✓	✓	✓	✓
Richmond, VA	✓		✓	✓	✓
Riverside-San Bernardino-Ontario, CA	✓		✓	✓	✓
Rochester, NY	✓		✓	✓	✓
Sacramento-Arden-Arcade-Roseville, CA		✓	✓	✓	✓
Salt Lake City, UT	✓		✓	✓	
San Antonio-New Braunfels, TX	✓		✓		✓
San Diego-Carlsbad-San Marcos, CA	✓	✓	✓	✓	✓
San Francisco-Oakland-Fremont, CA	✓		✓	✓	✓
San Jose-Sunnyvale-Santa Clara, CA		✓	✓	✓	✓
Scranton-Wilkes-Barre, PA					
Seattle-Tacoma-Bellevue, WA	✓	✓	✓	✓	✓
Springfield, MA					
St. Louis, MO-IL	✓	✓	✓	✓	✓
Stockton, CA					
Syracuse, NY	✓	✓	✓	✓	✓
Tampa-St. Petersburg-Clearwater, FL	✓		✓	✓	✓
Toledo, OH	✓		✓	✓	✓
Tucson, AZ	✓	✓	✓	✓	✓
Tulsa, OK					
Virginia Beach-Norfolk-Newport News, VA-NC	✓	✓		✓	✓
Washington-Arlington-Alexandria, DC-VA-MD-WV	✓	✓	✓	✓	✓
Wichita, KS	✓	✓			✓
Worcester, MA	✓		✓		✓
Youngstown-Warren-Boardman, OH-PA					

Conclusion and Next Steps:

The Chamber will continue to work with elected officials at the local and state levels as well as the College of Charleston and MUSC to develop a strategy for addressing the region's higher education needs. If you would like to be involved or want more information, please contact the Chamber's Business Advocacy Division at 843-577-2510.

Charleston Metro
Chamber of Commerce

Driving growth. Defining tomorrow.

4500 Leeds Avenue, Suite 100
N. Charleston, SC 29405
843.577.2510
www.charlestonchamber.net