COLLEGE OF ENGINEERING & COMPUTING

Blueprint for Academic Excellence

February, 2011

Vision Statement

The College of Engineering & Computing will be, and recognized as being, pre-eminent in its teaching, research, and service to the State of South Carolina and the south east, and a leader in the nation.

Mission

The mission of the College of Engineering and Computing is to attract the best undergraduate and graduate students, and by attracting the best faculty will provide the State of South Carolina and the nation with an effective resource for industry, government and academia in economic and workforce development. This will be achieved by strong research in all engineering disciplines thus maintaining the attractiveness and viability of our degree programs (undergraduate and graduate), furthering the capability of both supporting State and national industry and providing the means to attract industry (manufacturing and knowledge generation) to South Carolina.

Goals

The specific goals of the College of Engineering & Computing include:

1. Continue the vigorous recruitment of top quality faculty to further enhance the viability and visibility of its top-rank capability, and provide a better critical mass of department size.
2. Increase enrollments in both undergraduate and graduate degree programs, while maintaining quality of students.
3. Capitalize on our recent NRC rankings and transform those into widespread recognition of the quality and prestige of the College and University.

Executive Summary

Rankings

Undergraduate Engineering Programs		Graduate Engineering Programs	
Rank		Rank	
1	MIT	1	MIT
2	Stanford	2	Stanford
2	UC Berkeley	3	UC Berkeley
4	CalTech	4	Georgia Tech
5	Georgia Tech	5	Univ. Illinois – Urbana Champaign
5	Univ. Illinois – Urbana Champaign	6	Carnegie Mellon
7	Carnegie Mellon	7	CalTech
7	Univ. Michigan – Ann Arbor	7	Univ. Southern California
9	Cornell	9	Univ. Michigan – Ann Arbor
9	Purdue	10	Univ. Texas, Austin
9	Univ. Texas, Austin		

Top 10 Engineering Colleges – US News & World Report

BioMed	ChemE	Civil	CompSci	Electrical	Mechanical	Nuclear
Vanderbilt	UCBerkeley	UCBerkley	MIT	MIT	MIT	MIT
Ga Tech	UCSB	UIUC	Stanford	Stanford	UCBerkeley	UIUC
UCSD	Cal Tech	Ga Tech	UC Berkeley	UIUC	U Michigan	U Michigan
NCSU/UNCC	UT Austin	UT Austin	CMU	UCBerkeley	Stanford	UCBerkeley
Duke	Wisconsin	MIT	UIUC	Ga Tech	Ga Tech	Wisconsin
U Conn	Minnesota	Purdue	Cornell	Mich.A A	CalTech	PennState
UT Austin	Stanford	Stanford	U Texas	CalTech	UIUC	Florida
UC Irvine	Michigan	Cornell	U Washington	Cornell	Purdue	NC State
Clemson	Delaware	UMich AA	Princeton	CMU	UT Austin	Purdue
Suny SB	UIUC	VA Tech	UMich AA	Purdue	RPI	Texas A&M

Top 10 Discipline-Specific Departments

BioMed	ChemE	Civil	CompSci	Electrical	Mechanical	Nuclear
Vanderbilt	Delaware	GA Tech	Clemson	Arkansas	Drexel	NC State
NCSU/UNCC	NC State	VA Tech	Oregon Sta	Miss. State	Wash.State	Ga Tech
UT Austin	Ga Tech	NC State	U. Conn.	U. Missouri	U. Conn	U. Tenn
Ga Tech	Virginia		U Kansas	U. Iowa	C. Florida	
UCSD	Florida		Wash State		UA Huntsv	

Peer Discipline-Specific Departments

The above charts are based upon USNWR rankings in the first instance, the peer discipline-specific chart is considered to be our 'local' peer comparisons.

Interestingly the recent NRC rankings will change a lot of this as we capitalize on our success with suitable publicity (to be discussed later).

Chemical Eng.		Civil Eng.		Electrical Eng.		Mechanical Eng.	
1	Caltech	1	Yale	1	Harvard	1	Brown
2	UC Santa Barb	2	Princeton	2	Princeton	2	Northwestern
3	UC Berkeley	3	CalTech	3	Stanford	3	Stanford
4	Princeton	4	GaTech	4	UC Santa Barb	4	CalTech
5	UT Austin	5	U. Cincinnati	5	**U South Carolina**	5	Johns Hopkins
30	**U South Carolina**	97	**U South Carolina**			28	**U South Carolina**

National NRC Research Quality Rankings – in all cases we are higher than Clemson!

National Rankings among Public Institutions

Chemical Eng.		Civil Eng.		Electrical Eng.		Mechanical Eng.	
1	UC Santa Barb	1	GaTech	1	UC Santa Barb	1	UCSD
2	UC Berkeley	2	UC Irvine	2	**U South Carolina**	2	UCSB
3	UT Austin	3	UIUC	3	Central Florida	3	Michigan
4	Minnesota	4	Penn State	4	UCLA	4	UIUC-Mechanics
5		5	UCSD	5	**UIUC**	5	UIUC-ME
14	**U South Carolina**	51	**U South Carolina**			12	**U South Carolina**

National NRC Research Quality Rankings (Public Institutions)

Top Strengths & Accomplishments

(Individual department input to be found in the Appendix)

1. Excellent NRC Rankings!
2. Creation of a new Biomedical Engineering Program. This program was approved in 2006, has graduated its first cohort of BS students. Currently has more than 200 undergraduate students and 35 graduate students.
3. Future Fuels research center. This has breadth and depth to demonstrate a leadership position nationally
4. Hiring of CoEE Chairs, plus NAE member
5. Structural Health Monitoring and Condition-Based Maintenance
6. Creation of Nuclear program
7. Further faculty positions to fill

Weaknesses and Plans for Addressing Weaknesses

(Individual department input to be found in Appendix)

1. Lack of a sufficient critical mass in faculty numbers in most departments: Several departments have less than 20 faculty – it is essential to get to 20-25 as a minimum for each department to be in a strong position to give credibility to the recent NRC rankings and allow for credible expansion.
2. Insufficient TA/Grader support: With low faculty numbers and increasing undergraduate student numbers the provision of adequate support by way of TAs and Graders is essential to reduce the overall load on research faculty. Already in place with Chemical Engineering and Electrical Engineering departments is the requirement for all graduate students to give 5 hours per week in TA/Grader work. Funds are sought for further graduate student support.
3. Insufficient Staff support: Staff are, in many cases, overworked as well as stressed with low morale. Frequent meetings are being held with staff to include them in planning for the future of the College and better use of resources to better provide merit raises when possible. A reorganization of staff across the College may make workload more equitable.
4. Insufficient space for research and teaching: As the College expands with recent faculty hiring and increased student numbers it becomes self-evident that space has become extremely limited. The College is committed to further increases in faculty and students and therefore space will need to be addressed urgently. A near term fix might be to reduce the number of computer labs with the assumption that most students now have their own computers. Further than that will require consideration of modular buildings to be provided.
5. Inadequate marketing capability: Central to our future success is the ability to 'market' our success. The recent NRC rankings are a case in point – virtually no marketing at any level in the University has been done to exploit this magnificent windfall. The College is in the process of creating a position description for a marketing person in conjunction with the VP for Communications.
6. Lack of a College-wide research vision: It has become evident that any college can achieve much more by exploiting the individual skills of the departments in collaborative goals. The College is to embark upon a college-wide research vision during this semester and culminating in a 1-2 day retreat. Knowledge of the University's research vision would help immensely!

Goals Preamble

The College of Engineering & Computing provides a strong engineering education and research basis from which to expand. The recent NRC rankings have confirmed the quality of research work performed by our faculty, but this must be capitalized upon by increasing the overall size of our operation to establish a sustainable critical mass. An increase of as much as 50% in the student body (undergraduate and graduate) should be targeted which will also require a continued investment in faculty positions and facilities.

The College's faculty have demonstrated the capability to be adaptive to new developments as illustrated by the creation of a program in Nuclear Engineering and in Biomedical Engineering. This will also create challenges that will need to be confronted. The success of these new programs will drive pressure to create new departments. For example, to create a new department in Biomedical Engineering would remove significant faculty resources from other departments, which may, perhaps, be too small for long-term viability without those faculty resources. However it does show that the programs being offered are very popular and fulfilling a strong need.

Short Term Goal We have CoEE chairs to fill in both nuclear and in biomed, but in the very short term an increase in faculty positions for biomed is essential – an immediate increase of 4-5 positions over what is currently allocated is required. We must watch the development of the nuclear program, carefully monitoring the progress in student recruitment.

Short Term Goal The Future Fuels research center is a wonderful example of how a strong program, both in breadth and depth, can be created forming a national, as well as local, resource that South Carolina can be proud of. It is necessary for us to exploit this vigorously and immediately. Current proposals within NSF, DoD, and elsewhere, are continuing to move strongly into energy and we must continue to be ready to exploit this interest. More immediately we have begun work to create a university-wide umbrella center tentatively called "Sustainable Energy" that would contain Future Fuels, but also Arts and Sciences, the Moore School and Law to cover policy issues as well. In this way we hope to establish the University of South Carolina as a major force for the nation in this arena.

Short Term Goal All these initiatives will require a more prominent support of marketing by the College and the University. We recognize the recent hire of Luanne Lawrence, and the College is seeking advice on the hiring of its own marketing person – this will also require extra resources to support print materials etc.

We continue to recruit strong faculty, both by replacing retirements and through net new hires, thus the college will change its overall perspective to one with a greater emphasis on research. A focus on teaching quality will continue to be critical but we do need to exploit our capabilities much more effectively than currently. In some departments in the College there are senior research faculty teaching 4 classes per academic year – this is an unacceptable load.

Short Term Goal The College must look to be more effective with its limited resources. We are to initiate a curriculum reform process both with the departments and College-wide to reevaluate our current programs and to consider a common 1-2 years for all engineers. Efficiencies could also be gained through the merging of existing classes in different departments, but this would also require larger classrooms being made available. Resources for classroom conversion and/or greater access to larger classrooms to aid in this will be required.

Short Term Goal There is little evidence so far of College-wide strategic planning. The departments appear to have planning exercises, but no cohesive college approach to utilize our joint strengths. Clearly this must happen and we are already beginning to plan for such an exercise together with a retreat either at the end of the Spring 2011 semester or just before the start of the Fall 2011 semester. This is the clear way to best use our resources and enable cross disciplinary research and teaching leading to strong ERC and IGERT research proposals.

5 Year Goal Greater emphasis can be placed on distance learning provision at all levels. This has the effect of making the College, and University, more accessible to potential undergraduate and graduate students – conversion of two-year degrees to four-year degrees for mature students (not to be confused with transfer students from 2 year colleges), part-time masters and Ph.D. degrees, plus the creation of 'executive' masters degrees. We are already in discussions with GE in up-state over assisting them with conversion courses – they have indicated an interest in helping with resources to facilitate such a program. More distance learning provision would require investment in making *all* classrooms have an on-line/recordable capability – having all classes recorded would be a valuable addition to our capabilities also for our own full-time students. An 'executive' masters degree (Engineering Management – in collaboration with the Moore School) has already been discussed with several companies and who have shown great interest in its availability both for on-site provision and distance learning.

5 Year Goal Expansion is clearly necessary! We will need to work to increase undergraduate numbers whilst maintaining quality – this requires better outreach and marketing (we are already taking steps in both these areas) – and increased numbers of graduate students. We need to work on attracting more graduate students applicants; this must be multi-faceted in the sense of attracting more US citizens, as well as encouraging applicants for overseas. An important factor in this will be the provision of funds to provide 1 year scholarships to entering graduate students – this is already a part of our development plan. In attracting more US citizens to do graduate studies we can certainly do more by marketing the 5 year masters degree concept. In acknowledging the existing program, this needs to be taken further by opening up to everyone with a 3.0 gpa and with enticements of guaranteed internships and/or co-ops, for example. We continue to vigorously create links with other academic institutions outside the US to facilitate the movement of high quality graduate students to the University of South Carolina.

5 Year Goal Facilities – we are already severely limited with respect to space and have a number of research faculty still to recruit. An expansion in student numbers will add to the

magnitude of the problem. This is likely to be a near-term requirement! Clearly a new building in not to be contemplated either time-wise or financially in the required timescales. Serious consideration will need to be given to the provision of modular buildings in the vicinity of the Swearingen Building. Suitable structures can be obtained with a focus on teaching space, thus freeing up space in Swearingen that could be reassigned for faculty and research. Pragmatically, a modular building makes sense as it costs significantly less, is available in a relatively short time (6-9 months) and would allow the College to demonstrate both to donors, the University, and to the State the need for a new building in the medium time-frame.

5 Year Goal Inevitably there is also the concern over salaries having stagnated for so long. All the faculty and staff are very dedicated to the College and to the University but the effect on morale is significant. Every effort must be made to address this issue. When possible this College will judiciously use its resources to provide merit-based raises and by recognizing increased workload in staff by reassessing their job descriptions. Executive masters degrees and distance learning with subsequent need for summer lab classes will also aid in the ability to provide supplemental income for those assisting in their operation.

The College of Engineering & Computing is now well poised to move forward on a number of fronts – the recent NRC rankings were a very welcome morale boost which we must continue to exploit enthusiastically. There is now a sense of (to borrow a well-used campaign slogan…) “Yes we can!” This is immediately evident from the way departments are now looking forward and broader, by creating visionary and leadership initiatives within and without the University rather than reacting. For example the department of Computer Science & Engineering is moving ahead with a proposal for ‘Virtual Computing’ as a way to coordinate academic computing across the campus as just one example. There are other major initiatives being contemplated as we go forward.

APPENDIX

Unit Statistical Profile (start 1/19/2011)

1. Number of entering freshman for classes Fall 2008, Fall 2009, and Fall 2010 and their average SAT and ACT Scores

Classes	Number	Average SAT	Avg ACT
Fall 2008	356	1219	26.0
Fall 2009	392	1240	27.6
Fall 2010	431	1219	27.0

2. Freshmen retention rate for classes entering Fall 2008, Fall 2009, and Fall 2010.

Fall 2008 _____82.3%_____, Fall 2009 ___86.3%___, Fall 2010 Not available. (per Mike P)

3. Number of majors enrolled in Fall 2008, Fall 2009, and Fall 2010 by level (headcount and FTE; undergraduate, certificate, first professional, masters, doctoral).

By Headcount

Majors	Fall 2008	Fall 2009	Fall 2010
Undergraduate	1454	1584	1698
Certificate	1	0	0
First Prof.	0	0	0
Masters	120	104	195
Doctoral	216	269	328

By FTE

Majors	Fall 2008	Fall 2009	Fall 2010
Undergraduate	877	945	971
Certificate	0	0	0
First Prof.	0	0	0
Masters	85	76	86
Doctoral	148	178	210

4. Number of entering first professional and graduate students Fall 2008, Fall 2009, and Fall 2010 and their average GRE, MCAT, LSAT scores, etc. Data below came from U.S. News and World Reports Surveys for Fall 08, Fall09, and Fall10. We do not have first professional students in our college. The data is for the combined Masters and Doctoral GRE scores of new entrants into the two programs.

Semester	Number graduate students	Mean Verbal GRE	Mean Quantitative GRE	Mean Analytical Writing GRE
Fall 2008	89	469	727	3.90
Fall 2009	190	449	735	3.3
Fall 2010	90	435	738	3.3

5. Number of graduates in Fall 2009, Spring 2010, and Summer 2010 by level (undergraduate, certificate, first professional, masters, doctoral) and placement of terminal masters and doctoral students. We do not track data regarding placement of terminal masters and doctoral students in the college.

Degrees Awarded	Fall 2009	Spring 2010	Summer 2010	Placement??
Undergraduate	59	158	22	
Certificate	0	0	0	
First Prof.	0	0	0	
Masters	27	18	11	Not tracked
Doctoral	8	17	7	Not tracked

6. Four-, Five- and Six-Year Graduation rates for three most recent applicable classes (undergraduate only).

Class	Four Year	Five Year	Six Year
2002	20.7 \ 12.7 \ 34.4	33.4 \24.9 \ 58.3	35.2 \ 27.7 \ 63.0
2003	19.2 \ 16.7 \ 36.0	30.6 \ 28.7 \ 59.3	32.2 \ 30.2 \ 62.5
2004	23.6 \ 11.7 \ 35.3	33.3 \ 21.4 \ 54.7	35.6 \ 23.0 \ 58.6

Same school\Different school\ Total

7. Total credit hours generated by your unit (regardless of major) for Fall 2009, Spring 2010 and Summer 2010.

Fall 2009	Spring 2010	Summer I 2010	Summer II 2010
16,500	15,808	744	460

8. Number of undergraduate and graduate credit hours, stated separately, taught by tenured and tenure-track faculty, by instructors, by non tenure-track faculty (clinical and research) and by temporary faculty (adjuncts).

	tenured	Non-tenured	instructors	Adjuncts (includes grad students)	total
Grad	**5,670**	**36**	**0**	**354**	**6,060**
Undergrad	**16,877**	**144**	**1,869**	**6,829**	**25,719**

9. Number of faculty by title (tenure-track by rank, research or clinical by rank), for Fall 2008, Fall 2009, and Fall 2010 (by department where applicable). Includes Provost Amiridis and Senior Vice Provost C. Curtis.

TTF	Fall 2008	Fall 2009	Fall 2010
Professor	30	33	35
Assoc. Prof	31	34	38
Asst. Prof.	25	27	29
Total	**86**	**94**	**102**

Research Fac	Fall 2008	Fall 2009	Fall 2010
Professor	4	5	5
Assoc. Prof	2	2	5
Asst. Prof.	8	8	9
Total	**14**	**15**	**19**

10. Total continuing education units (standard University CEUs or Institutional CEUs) generated for Fall 2009, Spring 2010 and Summer 2010. (Please refer to policy RACM 1.04.) Percent of credit hours, by undergraduate major, taught by faculty with highest terminal degree.

    Not applicable for College of Engineering and Computing

11. Percent of credit hours by undergraduate major, taught by full-time faculty.

BMEN	ECHE	ECIV	ELCT	EMCH	CSCE
80.3%	84.6%	83.1%	89.0%	70.5%	91.6%

Scholarship, Research and Creative Accomplishments

1. Numbers of publications in calendar years 2008, 2009 and 2010 by category (e.g., books, book chapters, refereed articles, non-refereed publications).

CHE	Books	Book Chapters	Refereed journal articles	Non-refereed publications
2008	2	2	57	11
2009	0	4	64	0
2010	2	4	44	26

CEE	Books	Book Chapters	Refereed journal articles	Non-refereed publications
2008	1	0	30	3
2009	0	0	19	8
2010	0	1	37	22

EE	Books	Book Chapters	Refereed journal articles	Non-refereed publications
2008	0	2	29	7
2009	2	0	44	4
2010	1	3	37	0
ME	**Books**	**Book Chapters**	**Refereed journal articles**	**Non-refereed publications**
2008	2	9	55	28
2009	4	3	66	25
2010	0	5	95	62

CSE	Books	Book Chapters	Refereed journal articles	Non-refereed publications
2008	3	7	46	10
2009	5	4	26	2
2010	0	1	68	2

2. Number of research paper presentations at national or international conferences in calendar year 2010.

	CHE	CEE	EE	ME	CSE
Research paper presentations	84	70	33	76	49

3. List the national awards, scholarships, and fellowships awarded to faculty in calendar year 2010.

CEE Awards

Berge, Nicole D., American Society for Engineering Education (ASEE) Environmental Division Early Career Grant Award

Gassman, Sarah L., an honorary membership in the Pile Driving Contractors Association (PDCA)

Meadows, Michael E., American Society of Civil Engineers (ASCE) the Lifetime Professional Achievement Award

CHE Awards

Weidner, John, Electrochemical Society Fellow, 2010

Weidner, John, Research Award of the Energy Technology Division, Electrochemical Society, 2010

CSE Awards

Bakos, Jason, NSF CAREER Award (7/15/09)

Hu, Jianjun, NSF CAREER Award (8/1/09)

Huang, Chin Tser, United States Air Force Summer Faculty Fellowship

O'Kane, Jason, DARPA Computer Science Study Panel

O'Kane, Jason, NSF CAREER Award (8/15/10)

Valtorta, Marco, American Institute of Mathematics Square Award

Xu, Wenyuan, NSF CAREER Award (9/1/09)

EE Awards

Ali, Mohammod, Visiting Summer Faculty Researcher, Air Force Research Laboratory, Wright Patterson Air Force Base, Ohio

Mandal, Krishna, DARPA Young Faculty Award (YFA)

Shin, Yong-June, NSF Graduate Research Fellowship

4. Number of performances and/or juried exhibitions at national or international venues in calendar year 2010.

None, not applicable to College of Engineering and Computing.

5. Summary of sponsored research activity for FY 2010 to include grant applications submitted and awarded, arranged by sponsoring agency.

Chemical Engineering FY10 Awards

Sponsoring Agency	PI Name	Total Sponsor
The Boeing Company	Amiridis, Michael	$7,500.00
National Science Foundation (NSF)	Moss, Melissa	$80,000.00
Ctr for Transportation & the Environment (CTE) /DOT	Davis, Thomas	$93,190.00
National Heart, Lung & Blood Institute (NHLBI)/NIH	Weidner, John	$35,500.00
National Science Foundation (NSF)	Williams, Christopher	$99,966.00
SC State University/NSF	Moss, Melissa	$13,285.00
National Science Foundation (NSF)	Jabbari, Esmaiel	$80,000.00
Ctr for Transportation & the Environment/SCRA/HUD	Davis, Thomas	$14,664.00
Office of Naval Research (ONR)/DOD	White, Ralph	$100,000.00
National Science Foundation (NSF)	Williams, Christopher	$6,000.00
Nat. Inst. of Dental & Craniofacial Research (NIDCR)/NIH	Jabbari, Esmaiel	$106,920.00
National Center for Research Resources (NCRR)/NIH	Jabbari, Esmaiel	$4,710.00
National Science Foundation (NSF)	Weidner, John	$300,000.00
SeQual Technologies Inc./DARPA	Ritter, James	$289,999.00
National Science Foundation (NSF)	Monnier, John	$329,887.00
National Science Foundation (NSF)	Jabbari, Esmaiel	$40,590.00
National Science Foundation (NSF)	Ritter, James	$100,000.00
National Science Foundation (NSF)	Moss, Melissa	$40,590.00
National Science Foundation (NSF)	Heyden, Andreas	$300,000.00
National Science Foundation (NSF)	Jabbari, Esmaiel	$285,000.00
US Department of Energy (DOE)	Heyden, Andreas	$104,619.00
National Space Biomedical Research Institute/NASA	Ritter, James	$225,000.00
College of Charleston/NASA EPSCoR	Ritter, James	$140,000.00
CellTech/US Army Research Office (ARO)	White, Ralph	$125,000.00
National Renewable Energy Laboratory (NREL)/DOE	Van Zee, John	$400,250.00
SC Research Authority (SCRA)\SC EPSCoR\NSF	Matthews, Michael	$1,100.00
SC Research Authority (SCRA)/SC EPSCoR/NSF	Weidner, John	$1,100.00
UChicago Argonne LLC for Argonne Nat. Lab/DOE	Stanford, Thomas	$7,552.00
National Science Foundation (NSF)	Popov, Branko	$300,000.00
Farasis Inc/NASA	Popov, Branko	$31,153.00
Giner Electrochemical Systems, LLC/DOE	Van Zee, John	$266,668.00
Giner Electrochemical Systems, LLC/DOE	Weidner, John	$20,000.00
National Science Foundation (NSF)	Moss, Melissa	$300,000.00
SC Research Authority (SCRA)/SC EPSCoR	Ritter, James	$19,800.00
SC Spinal Cord Fund/MUSC	Jabbari, Esmaiel	$100,000.00
SC EPSCoR	Ritter, James	$11,948.00
SC EPSCoR	Popov, Branko	$17,814.00
BASF Corporation	Amiridis, Michael	$183,437.00

Various Sponsors	Van Zee, John	$37,000.00
Various Sponsors	Van Zee, John	$9,625.00
Toyota Technical Center, USA, Inc.	Williams, Christopher	$165,101.00
Various Sponsors	Van Zee, John	$118,000.00
Various Sponsors	Van Zee, John	$46,376.00
Various Sponsors	Van Zee, John	$12,500.00
UOP, LLC - A Honeywell Company	Monnier, John	$128,143.00
ALSTOM Power Inc.	Williams, Christopher	$8,119.00
SC CHE Endowed Chair Program/Santee Cooper	Ritter, James	$171,636.00
E.ON AG	Weidner, John	$138,193.00
Various Sponsors	Van Zee, John	$1,800.00
Various Sponsors	Van Zee, John	$35,000.00
Various Sponsors	Van Zee, John	$35,000.00
UOP LLC	Williams, Christopher	$40,000.00
Various Sponsors	Van Zee, John	$34,999.00
Various Sponsors	Van Zee, John	$36,000.00
SC CHE Endowed Chair Program/Santee Cooper	Lauterbach, Jochen	$600,000.00
Smith and Nephew	Matthews, Michael	$1,500,000.00
SC CHE Endowed Chair Program/Santee Cooper	Amiridis, Michael	$900,000.00
AESF Found/Nat Assoc Surface Finishing (NASF)	Popov, Branko	$16,000.00
Nat. Metal & Materials Technology Ctr (MTEC)	Shimpalee, Sirivatch	$29,488.00
University of Texas at Austin	Ritter, James	$100,000.00
SC General Assembly	Van Zee, John	$880,161.00
SC General Assembly	Matthews, Michael	$1,000,000.00
SC Research Authority (SCRA)/SC EPSCoR/NSF	Amiridis, Michael	$900,000.00
SC EPSCoR Program	Amiridis, Michael	$4,653.00

Civil and Environmental Engineering FY10 Awards

Sponsoring Agency	PI Name	Total Sponsor
Advanced Technology Institute/DOD	Rizos, Dimitris	$32,350.00
Univ of Texas at Austin/NSF	Goodall, Jonathan	$53,613.00
National Science Foundation (NSF)	Chaudhry, M.	$899,302.00
Physical Acoustics/NIST/DOC	Ziehl, Paul	$292,891.00
National Science Foundation (NSF)	Caicedo, Juan	$47,339.00
Texas Res. Inst. Austin/US Air Force	Ziehl, Paul	$20,000.00
National Science Foundation (NSF)	Caicedo, Juan	$400,000.00
National Science Foundation (NSF)	Caicedo, Juan	$30,000.00
National Science Foundation (NSF)	Saleh, Navid	$57,007.00
SC Dept of Transportation / (FHWA)	Pierce, Charles	$133,362.00
SC State University/USFHWA	Huynh, Nathan	$25,000.00

SC Department of Transportation/FHWA	Ziehl, Paul	$149,517.00
SC Department of Transportation	Chaudhry, M.	$67,610.00
Richland County	Goodall, Jonathan	$10,035.00
GS Engineering and Construction Corp.	Yoon, Yeomin	$220,000.00
The SEFA Group	Gassman, Sarah	$1,890.00
Force Protection Industries, Inc.	Ziehl, Paul	$29,800.00
Clemson University/HSSC	Huynh, Nathan	$42,292.00
NC State U.-ITRE/NC Dept. of Transp.	Huynh, Nathan	$10,756.00
The Ministry of Land, Transport, and Maritime Affairs in Korea/Kookmin University	Yoon, Yeomin	$4,718.00

Computer Science and Engineering FY10 Awards

Sponsoring Agency	PI Name	Total Sponsor
NSF	Valafar, Homayoun	$135,875.00
UNC at Charlotte/NSF	Eastman, Caroline	$10,461.00
NSF	Vidal, Jose	$83,179.00
NSF	Bakos, Jason	$293,661.00
NSF	Quan, Gang	$16,000.00
NSF	Fenner, Stephen	$196,645.00
NSF	Bakos, Jason	$155,004.00
NSF	Hu, Jianjun	$579,818.00
NSF	Nelakuditi, Srihari	$250,001.00
NSF	Tang, Jijun	$324,968.00
NSF	Tang, Jijun	$197,008.00
NSF	Wang, Song	$74,963.00
Nat Inst. of Gen. Med. Sciences (NIGMS)/NIH	Tang, Jijun	$88,299.00
The Res. Found.of SUNY/AFRL	Huang, Chin-Tser	$10,000.00
NSF	Huang, Chin-Tser	$200,000.00
NSF	Eastman, Caroline	$329,364.00
NSF	Valafar, Homayoun	$162,325.00
NSF	Tang, Jijun	$16,000.00
NSF	O'Kane, Jason	$99,957.00
NSF	Rose, John	$398,882.00
NSF	Xu, Wenyuan	$16,000.00
NSF	O'Kane, Jason	$464,466.00
NSF	Bakos, Jason	$7,500.00
SC Developmental Disabilities Council/HHS	O'Kane, Jason	$15,080.00
NEH	Buell, Duncan	$84,310.00
College of Charleston/NASA	Bowles, John	$7,500.00

Electrical Engineering FY10 Awards

Sponsoring Agency	PI Name	Total Sponsor
Office of Naval Research (ONR)/DOD	Dougal, Roger	$100,000.00
Office of Naval Research (ONR)/DOD	Dougal, Roger	$66,000.00
Office of Naval Research (ONR)	Dougal, Roger	$137,557.00
Office of Naval Research (ONR)	Dougal, Roger	$183,000.00
Florida State University/ONR	Dougal, Roger	$1,634,197.00
National Science Foundation (NSF)	Khan, Asif	$74,180.00
National Science Foundation (NSF)	Koley, Goutam	$12,000.00
SC Research Authority (SCRA)/HUD	Dougal, Roger	$28,000.00
Nitek/Air Force Office of Scientific Research (AFOSR)	Khan, Asif	$30,000.00
National Science Foundation (NSF)	Dougal, Roger	$275,000.00
National Science Foundation (NSF)	Dougal, Roger	$40,000.00
US Nuclear Regulatory Commission	Shin, Yong-June	$70,900.00
SENS4/NSF	Koley, Goutam	$29,997.00
Sensor Electronic Technology, Inc./ONR/DOD	Simin, Grigory	$21,000.00
Northrup Grummun Corp/DOD	Khan, Asif	$1,252,195.00
Sensor Electronic Technology/DOD	Simin, Grigory	$128,000.00
Structured Materials Industries, Inc./NSF	Koley, Goutam	$30,000.00
Office of Naval Research (ONR)	Sudarshan, Tangali	$75,000.00
Office of Naval Research (ONR)	Dougal, Roger	$250,000.00
National Science Foundation (NSF)	Shin, Yong-June	$40,500.00
National Science Foundation (NSF)	Koley, Goutam	$10,000.00
Sensor Electronic Technology, Inc/US NAVY	Simin, Grigory	$10,000.00
Space & Naval Warfare Systems Ctr (SSC)Pacific/DARPA/DOD	Mandal, Krishna	$154,800.00
Various Sponsors	Dougal, Roger	$18,000.00
Various Sponsors	Dougal, Roger	$50,000.00
Various Sponsors	Shin, Yong-June	$50,000.00
Various Sponsors	Santi, Enrico	$50,000.00
Osram Sylvania, Inc.	Khan, Asif	$182,000.00
Various Sponsors	Dougal, Roger	$12,000.00
SE Ctr for Electrical Eng. Education (SCEEE)	Zhao, Feng	$24,000.00
Palmetto Health	Shin, Yong-June	$12,984.00

Mechanical Engineering FY10 Awards

Sponsoring Agency	PI Name	Total Sponsor
US Army Research Office (ARO)/DOD	Li, Xiaodong	$50,000.00
Sandia National Laboratories/DOE	Khan, Jamil	$95,417.00
University of Maryland/ARO/DOD	Deng, Xiaomin	$50,000.00
National Institute of Aerospace/NASA	Reynolds, Anthony	$64,529.00
Office of Naval Research (ONR)	Reynolds, Anthony	$77,564.00
Physical Acoustics/NIST	Giurgiutiu, Victor	$80,470.00
Air Force Ofc of Scientific Res (AFOSR)/DOD	Sutton, Michael	$400,000.00
Air Force Ofc of Scientific Res (AFOSR)/DOD	Sutton, Michael	$6,500.00
National Science Foundation (NSF)	Lyons, Jed	$149,999.00
National Science Foundation (NSF)	Reynolds, Anthony	$139,995.00
National Science Foundation (NSF)	Reynolds, Anthony	$40,000.00
National Science Foundation (NSF)	Giurgiutiu, Victor	$239,997.00
US Department of Energy (DOE)	Reifsnider, Kenneth	$1,896,375.00
US Department of Energy (DOE)	Chen, Fanglin	$153,224.00
US Department of Energy (DOE)	Xue, Xingjian	$100,167.00
US Department of Energy (DOE)	Reifsnider, Kenneth	$41,443.00
Battelle Energy Alliance, LLC/DOE	Chen, Fanglin	$497,500.00
SC National Guard/DOD	Bayoumi, Abdel	$125,000.00
SC National Guard/DOD	Bayoumi, Abdel	$757,500.00
SC National Guard/DOD	Bayoumi, Abdel	$94,000.00
Battelle Energy Alliance, LLC/DOE	Knight, Travis	$4,632.00
S Dakota School of Mines & Technology/NSF	Reynolds, Anthony	$33,268.00
WinTec Arrowmaker/US Army	Reifsnider, Kenneth	$1,580,000.00
National Institute of Aerospace/NASA	Reynolds, Anthony	$64,473.00
SC National Guard/DOD	Bayoumi, Abdel	$250,000.00
SC National Guard/DOD	Bayoumi, Abdel	$250,000.00
SC Space Grant Consortium/NASA	Chen, Fanglin	$16,000.00
ENrG Inc. /DARPA/DOD	Chen, Fanglin	$100,000.00
National Science Foundation (NSF)	Huang, Xinyu	$178,938.00
National Science Foundation (NSF)	Chen, Fanglin	$280,000.00
National Science Foundation (NSF)	Chen, Fanglin	$232,248.00
Batelle - Pacific NW Division/DOE	Reynolds, Anthony	$30,000.00
National Science Foundation (NSF)	Li, Xiaodong	$300,000.00
Army Research Office (ARO)/DOD	Giurgiutiu, Victor	$49,996.00
National Science Foundation (NSF)	Wang, Guiren	$400,000.00
Nuclear Regulatory Commission	Knight, Travis	$381,016.00
SCUREF/DOE	Khan, Jamil	$36,917.00
SC Space Grant Consortium & NASA EPSCoR SC	Huang, Xinyu	$30,000.00
US Department of Energy (DOE)	Knight, Travis	$10,000.00

US Nuclear Regulatory Commission (NRC)	Knight, Travis	$59,825.00
SCUREF/DOE	Li, Xiaodong	$30,246.00
Air Force Ofc of Scientific Res (AFOSR)/DOD	Reifsnider, Kenneth	$657,704.00
Westinghouse Electric Co. LLC	Khan, Jamil	$46,158.00
Various Sponsors	Reynolds, Anthony	$162,200.00
Lockheed Martin	Reynolds, Anthony	$61,781.00
ALCAN Centre de Recherches de Voreppe	Reynolds, Anthony	$30,000.00
NextGenEn, Inc	Chen, Fanglin	$2,696.00
Westinghouse Electric Company LLC	Li, Xiaodong	$15,000.00
North American Mixing Forum (NAMF)	Wang, Guiren	$60,000.00
Wendy Will Case Cancer Fund, Inc.	He, Xiaoming	$30,000.00

6. Total extramural funding processed through SAM in FY 2010, and Federal extramural funding processed through SAM in FY2010. (Provided by SAM at http://sam.research.sc.edu/awardrpt.html or https://sam.research.sc.edu/uscera. Contact SAM Office at 7-7093 for guidance if needed.)

Federal Extramural Funding in FY10, and Total Extramural Funding in FY10

Department	Federal Amounts	Total Amounts
CEC	314,883	314,833
CHE	5,106,231	5,373,024
COEE Awards to CHE	0	4,880,161
NSF RII Award to Provost	900,000	904,653
CEE	2,140,381	2,527,482
CSE	4,217,266	4,217,266
EE	4,652,326	5,051,310
ME	10,034,943	10,442,778
Awards to Reifsnider		
SCAMP	201,239	235,145
Total	**26,667,269**	**33,946,702**

7. Total research expenditures per tenured/tenure-track faculty for FY 2010, by rank and by department if applicable.

Department	TTF	Res Exp/TTF
CHE	17	333,920
CEE	17	119,431
CSE	21	67,140
EE	16	338,040
ME	23	292,698

8. Amount of sponsored research funding per faculty member for FY 2010 (by rank, type of funding; e.g., federal competitive versus non-competitive, state, etc., and by department if applicable).

Chemical Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Amiridis, M.D.			183,437	183,437
Matthews, M.A.	1,100		4,500	5,600
Popov, B.N.	331,153	17,814	16,000	364,967
Ritter, J.A.	754,999	31,748	100,000	886,747
Van Zee, J.W.	666,918		204,250	871,168
Weidner, J.W.	344,348		138,193	
White, R.E.	287,091			287,091
Williams, C.T.	105,966		213,220	319,186

Chemical Engineering Professors specific COEE/CEC/Dept purpose

Faculty	Fed Competitive	State	Other	Total
Amiridis, M.D.	900,00 (NSF RII) Provost Ofc	4,653 (NSF RII match)	900,000 COEE 7,500 scholarship	1,812,153
Matthews, M.A.		$1,000,000 COEE	$1,500,000 COEE	2,500,000
Ritter, J.A.			171,636 COEE	171,636
Van Zee, J.W.		880,161 COEE		880,161

Ploehn $500,000 Stimulus funds for college

Chemical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Jabbari, E.	517,220	100,000	2,922	620,142
Moss, M. A.	433,875		9,000	442,875

Sponsored research funding amount per faculty for FY2010 cont'd.

Chemical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Blanchette, J.			2,500	2,500
Heyden, A.	404,619			404,619
Stanford, T.	7,552			7,552

Chemical Engineering Research Professors

Faculty	Fed Competitive	State	Other	Total
Davis, Thomas	107,854			107,854
Monnier, John	329,887		128,143	458,030
St-Pierre, Jean			2,500	2,500

Civil and Environmental Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Chaudhry, M.H.	899,302	67,610		966,912

Civil and Environmental Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Caicedo, J.M.	477,339			477,339
Gassman, S.L.			1,890	1,890
Rizos, D.C	32,350			32,350
Pierce, C	133,362			133,362
Yoon, Yeomin	26,620		224,718	251,338
Ziehl, P.H.	462,408		29,800	492,208

Sponsored research funding amount per faculty for FY2010 cont'd.

Civil and Environmental Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Goodall, J.L.	53,613		10,035	63,648
Huynh, N.	25,000		55,548	80,548
Saleh, N.	57,007			57,007

Computer Science and Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Buell, D	84,310			84,310
Eastman, C.M.	339,825			339,825

Computer Science and Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Bowles, J.	7,500			7,500
Farkas, C.			6,000	6,000
Fenner, S.	196,645			196,645
Huang, C.T.	418,938			418,938
Matthews, Manton			1,500	1500
Nelakuditi, S.	250,001			250,001
Rose, John	398,882		2,500	401,382
Tang, Jijun	626,275			626,275
Valafar, H.	298,200		2,500	300,700
Vidal, J.	83,179			83,179
Wang, S.	74,963			74,963

Computer Science and Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Bakos, J	456,165			456,165
Hu, Jianjun	579,818		2,998	582,816
Xu, Wenyuan	16,000		2,500	18,500

Sponsored research funding amount per faculty for FY2010 cont'd.

Electrical Engineering Professors

Faculty	Fed Competitive	State	Other	Total
*Dougal, R.D.	1,079,557		80,000	1,159,557
*Khan, A.	1,356,375		182,000	1,538,375
Sudarshan, T.S	75,000			75,000

Federal Non-competitive funding Dougal, $1,634,197, Florida State Univ/ONR;

Federal Non-competitive funding A. Khan, $1,252,195, DoD***??? (included above)***

Electrical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Koley, G.	81,997			81,997
Mandal, K.	154,800			154,800
Santi, E			50,000	50,000
Simin, G.	159,000			159,000

Electrical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Chandrashekhar			6,000	6,000
Shin, Yong J.	111,400		62,984	174,384
Zhao, Feng			24,000	24,000

Sponsored research funding amount per faculty for FY2010 cont'd.

Mechanical Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Bayoumi, A.E.	1,476,500			1,476,500
Deng, Xiaomin	50,000			50,000
Giurgiutiu,V	370,463			370,463
Khan, J.A.	132,334		46,158	178,492
Li, Xiaodong	380,246		15,000	395,246
Lyons, J.S.	149,999			149,999
*Reifsnider, K.	2,595,522			2,595,522
Reynolds, A.P.	449,829		253,981	703,810
Sutton, M.A.	406,500			406,500

*Federal Non-Competitive Funding Reifsnider, 1,580,000, WintecArrowmaker/US Army

Mechanical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
NONE				

Mechanical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Chen, Fanglin	1,278,972		2,696	1,281,668
He, Xiaoming			30,000	30,000
Huang, Xinyu	208,938			208,938
Knight, Travis	455,473			455,473
Wang, Guiren	400,000	62,500		462,500
Xue, Xingjian	100,167			100,167

9. Percentage of unit faculty with sponsored research activity for FY 2010 (by rank and type of activity).

CHE	CEE	CSE	EE	ME
82%	72%	95%	87%	89%

10. Number of patents, disclosures and licensing agreements in calendar years 2008, 2009 and 2010

	CHE	CEE	CSE	EE	ME
Cal yr08	5		0	8	11
Cal yr09	11	0	0	13	17
Cal yr10	5	5	0	10	15

11. Number of proposals submitted to external funding agencies during calendar year 2010 (by type and by department if applicable).

Department	Federal	State	Other	Total
CEC	1	2		2
CHE	67	0	11	80
CEE	38	2	8	48
CSE	31	1	6	38
EE	53	0	2	55
ME	120	0	19	139
Total	**310**	**4**	**46**	**360**

Faculty Hiring

1.Number of faculty hired and lost for AY 2008, AY 2009, and AY 2010 (by department, if applicable, and by rank). Give reason for leaving, if known.

AY 2008 Hires

Department	Assistant Professor	Associate Professor	Professor
CHE	James Blanchette Andreas Heyden		
CEE	Jonathan Goodall		
CSE	Jianjun Hu Jason O'Kane Wenyuan Xu		
ME	Fanglin Chen Xiaoming He Arash Kheradvar Guiren Wang		Kenneth Reifsnider, SOFC COEE Director

AY 2008 Faculty Losses

1.Donald A. Keating, ME, Associate Professor, retired 2/26/08 (TERI end date)
2.William F. Ranson III, ME, Professor, retired 5/31/2008 (TERI end date)
3.Quan, Gang, CSE, Asst. Prof,, resigned smr 2008, did not pass 3rd year review
4.Delhommelle, Jerome, CHE Asst. Prof., resigned smr 2008, accepted position at another location
5.Haselbach, Elizabeth, CEE Asst. Prof., resigned smr 2008, accept position elsewhere
6.Cetin, Mecit, CEE Asst. Prof., resigned smr 2008, accepted position elsewhere
7.Harrison, Kenneth, CEE Asst Prof, resigned smr 2008, accepted position elsewhere

AY 2009 Hires

Department	Assistant Professor	Associate Professor	Professor
CEE	Nathan Huynh Nicole D. Berge Navid Saleh	Yeomin Yoon	
CSE	Max Alekseyev		
EE	Feng Zhao		
ME	Xingjian Xue		

AY 2009 Faculty Losses

Antonello Monti, EE Professor and Ferdinanda Ponci, Assistant Professor both resigned 1/1/2010 to accept positions in a German Institution

AY 2010 Hires

Department	Assistant Professor	Associate Professor	Professor
CHE		XD Zhou	
CEE	Fabio Matta		Robert Mullen, Chair
CSE			
EE	MVS Chandrashekhar	Krishna Mandal	
ME	Xinyu Huang Djamel Kaoumi Chen Li	Kevin Huang	

AY 2010 Faculty Losses

Ronald Baus, CEE, Professor, retired 6/30/2010 (TERI end date)

Vincent Van Brunt, CHE, Professor, retired 9/30/09 (TERI end date)

AY 2011 Hires

Department	Assistant Professor	Associate Professor	Professor
CHE	Jason Hattrick-Simpers Ehsan Jabbarzadeh		A. Jochen Lauterbach, Clean Coal CoEE Director
CEE	Chunyang Liu Jeong-Hoon Song		
CSE	Yan Tong		
EE		Herbert Ginn	
ME	Tarek Shazly Lingyu (Lucy) Yu		

AY 2011 Faculty Losses

Arash Kheradvar, ME, Asst Prof., accepted position at UC Irvine. 9/30/2010

Larry Stephens, CSE, Professor, retired 12/31/2010

2. Number of post-doctoral scholars (Ph.D., non-faculty hires) in FY 2008, 2009, 2010.

Department	FY08 PhD, non-fac hires	FY09 PhD, non-fac hires	FY10 PhD, non-fac hires
CHE	6	21	11
CEE	4	2	3
CSE	2	0	7
EE	6	3	5
ME	11	18	17

3. Anticipated losses of faculty by year for the next five years. Please supply reasons for departure if known; e.g., TERI period end, conventional retirement, resignation.

Department	Faculty	TERI end date
ME	Morehouse, Jeffrey, H.	12/31/2011
CHE	Stanford, Thomas G.	5/31/2012

Please describe planned hiring over the next five years (by department if applicable). Description to be written by Dean!!

Funding Sources:

1. Provide only "E" fund information as described in the **Funding Sources** heading in the Blueprint Guidance memo. We will need to see a TOTAL "E" fund balance for periods ending December 31, 2008, 2009 and 2010.

Ending Date	Total E Fund Balance
December 31, 2008	$4,870,956
December 31, 2009	$3,824,945
December 31, 2010	$4,008,138

2. Gifts and pledges received in FY 2010. (add information)

Please see attached 3 page report

UNIVERSITY OF SOUTH CAROLINA

Development Summary by Division

Columbia-Engineering and Computing - 0014

July - July 31, 2010

Cash Gifts from Prior Activity	FY 11
a. Pledge Payments Received	$282,642.26
b. Estate Gifts Received	$0.00
Subtotal (a + b)	$282,642.26

New Cash/Commitments	FY 11
c. New Cash/Property/In-Kind Grants	$119,149.00
d. New Pledges for Future Cash	$25,100.00
e. New Documented Planned Gifts (Irrevocable) Cat. B	$0.00
f. New Documented Planned Gifts (Revocable) Cat. C	$0.00
Subtotal (c + d + e + f)	$144,249.00

Number of Donors in New Cash/Commitments	FY 11
Number of Donors YTD	19

Proposals	FY 11
Proposals Received from All DoD's for this Division	0
Value of Proposals	$0.00
Average Proposal	$0.00

			FY 11
Proposal Outcomes	$	#	"Batting Average"
Funded	$0.00	0	0.00%
Still Pending	$0.00	0	0.00%
Rejected	$0.00	0	0.00%

University of South Carolina

Private Support New Monies Within Division By Designation

Campaign 7/1/2007 Through 7/31/2010

Engineering and Computing - 0014 8.22% of FY Elapsed 58.33% of Campaign Elapsed 45.71% of Campaign Goal Achieved	Designation	FYD Gifts / Commitments							Campaign Totals						
		Current FYD Gifts	Current FYD In Kind Gifts	Current FYD Philanthropy via SAM	Current FYD Planned Gifts Category B	Current FYD Planned Gifts Category C	Current FYD Outstanding Pledges	Current FYD Total	Campaign to Date FYD Gifts	Campaign to Date In Kind Gifts	Campaign to Date Philanthropy via SAM	Campaign to Date Planned Gifts Category B	Campaign to Date Planned Gifts Category C	Campaign to Date Outstanding Pledges	Campaign to Date Total
EXPENDABLE															
Area Designated Scholarships	C01	$500.00	$0.00	$0.00	$0.00	$0.00	$25,000.00	**$25,500.00**	$518,260.55	$0.00	$0.00	$0.00	$250,000.00	$313,763.10	**$1,082,023.65**
Carolina & National Merit/Achievement Scholars	C02	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Graduate/Professional Fellowships	C03	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$104,486.00	$0.00	$0.00	$0.00	$0.00	$55.00	**$104,541.00**
SUB-TOTAL STUDENT SUPPORT		**$500.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$25,000.00**	**$25,500.00**	**$622,746.55**	**$0.00**	**$0.00**	**$0.00**	**$250,000.00**	**$313,818.10**	**$1,186,564.65**
Professorships and Chairs	C04	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Faculty Development/Teaching Awards	C07	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
SUB-TOTAL FACULTY SUPPORT		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Program Enhancements	C05	$1,100.00	$0.00	$5,000.00	$0.00	$0.00	$50.00	**$6,150.00**	$253,091.75	$2,971.92	$533,190.00	$0.00	$0.00	$1,122,020.25	**$1,911,273.92**
Research/Equipment	C08	$0.00	$0.00	$107,429.00	$0.00	$0.00	$0.00	**$107,429.00**	$249,266.80	$8,350,470.38	$6,371,047.00	$0.00	$0.00	$7,134,170.00	**$22,104,954.18**
SUB-TOTAL PROGRAM ENHANCEMENTS		**$1,100.00**	**$0.00**	**$112,429.00**	**$0.00**	**$0.00**	**$50.00**	**$113,579.00**	**$502,358.55**	**$8,353,442.30**	**$6,904,237.00**	**$0.00**	**$0.00**	**$8,256,190.25**	**$24,016,228.10**
College/Campus Unrestricted	C06	$40.00	$0.00	$0.00	$0.00	$0.00	$50.00	**$90.00**	$157,080.23	$0.00	$0.00	$0.00	$0.00	$1,604.15	**$158,684.38**
University Unrestricted	C09	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Operations & Maintenance	C10	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
SUB-TOTAL UNRESTRICTED		**$40.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$50.00**	**$90.00**	**$157,080.23**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$1,604.15**	**$158,684.38**
TOTAL EXPENDABLE		**$1,640.00**	**$0.00**	**$112,429.00**	**$0.00**	**$0.00**	**$25,100.00**	**$139,169.00**	**$1,282,185.33**	**$8,353,442.30**	**$6,904,237.00**	**$0.00**	**$250,000.00**	**$8,571,612.50**	**$25,361,477.13**
ENDOWMENT															
Area Designated Scholarships	E01	$5,080.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$5,080.00**	$732,194.88	$0.00	$0.00	$0.00	$600,000.00	$15,666.55	**$1,347,861.43**
Carolina & National Merit/Achievement Scholars	E02	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Graduate/Professional Fellowships	E03	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$473,250.03	$0.00	$0.00	$0.00	$0.00	$0.00	**$473,250.03**
SUB-TOTAL STUDENT SUPPORT		**$5,080.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$5,080.00**	**$1,205,444.91**	**$0.00**	**$0.00**	**$0.00**	**$600,000.00**	**$15,666.55**	**$1,821,111.46**
Professorships and Chairs	E04	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$76,580.78	$0.00	$0.00	$0.00	$0.00	$0.00	**$76,580.78**
Faculty Development/Teaching Awards	E07	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$50,955.99	$0.00	$0.00	$0.00	$0.00	$15,908.39	**$66,864.38**
SUB-TOTAL FACULTY SUPPORT		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$127,536.77**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$15,908.39**	**$143,445.16**
Program Enhancements	E05	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$300.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$300.00**
Research/Equipment	E08	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$100,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$100,000.00**
SUB-TOTAL PROGRAM ENHANCEMENTS		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$100,300.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$100,300.00**
College/Campus Unrestricted	E06	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$1,490.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$1,490.00**
University Unrestricted	E09	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
Operations & Maintenance	E10	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
SUB-TOTAL UNRESTRICTED		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$1,490.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$1,490.00**
TOTAL ENDOWMENT		**$5,080.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$5,080.00**	**$1,434,771.68**	**$0.00**	**$0.00**	**$0.00**	**$600,000.00**	**$31,574.94**	**$2,066,346.62**
CAPITAL															
Buildings	P01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
SUB-TOTAL CAPITAL		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
TOTAL CAPITAL		**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Division Total		**$6,720.00**	**$0.00**	**$112,429.00**	**$0.00**	**$0.00**	**$25,100.00**	**$144,249.00**	**$2,716,957.01**	**$8,353,442.30**	**$6,904,237.00**	**$0.00**	**$850,000.00**	**$8,603,187.44**	**$27,427,823.75**

August 13, 2010

University of South Carolina

Division Summary By Featured Objective

Campaign 7/1/2007 Through 7/31/2010

DIVISION: ENGINEERING AND COMPUTING - 0014

58.33% of Campaign Elapsed 8.22% of FY Elapsed 45.71% of Campaign Goal Achieved	FYD Gifts / Commitments							Campaign Totals						
	Current FYD Gifts	Current FYD In Kind Gifts	Current FYD Philanthropy via SAM	Current FYD Planned Gifts Category B	Current FYD Planned Gifts Category C	Current FYD Outstanding Pledges	Current FYD Total	Campaign to Date FYD Gifts	Campaign to Date In Kind Gifts	Campaign to Date Philanthropy via SAM	Campaign to Date Planned Gifts Category B	Campaign to Date Planned Gifts Category C	Campaign to Date Outstanding Pledges	Campaign to Date Total
TOTAL STUDENT SUPPORT	$5,580.00	$0.00	$0.00	$0.00	$0.00	$25,000.00	**$30,580.00**	$1,828,191.46	$0.00	$0.00	$0.00	$850,000.00	$329,484.65	**$3,007,676.11**
TOTAL FACULTY SUPPORT	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$127,536.77	$0.00	$0.00	$0.00	$0.00	$15,908.39	**$143,445.16**
TOTAL PROGRAM ENHANCEMENTS	$1,100.00	$0.00	$112,429.00	$0.00	$0.00	$50.00	**$113,579.00**	$602,658.55	$8,353,442.30	$6,904,237.00	$0.00	$0.00	$8,256,190.25	**$24,116,528.10**
TOTAL UNRESTRICTED	$40.00	$0.00	$0.00	$0.00	$0.00	$50.00	**$90.00**	$158,570.23	$0.00	$0.00	$0.00	$0.00	$1,604.15	**$160,174.38**
TOTAL CAPITAL	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**
TOTAL	**$6,720.00**	**$0.00**	**$112,429.00**	**$0.00**	**$0.00**	**$25,100.00**	**$144,249.00**	**$2,716,957.01**	**$8,353,442.30**	**$6,904,237.00**	**$0.00**	**$850,000.00**	**$8,603,187.44**	**$27,427,823.75**

Biomedical Engineering (BME)

BLUEPRINT

February 19, 2011

INTRODUCTION

The Background of BME at USC:

The State of South Carolina has wisely invested in the infrastructure for a stake in the medical and health education and research. Biomedical engineering is an area of the healthcare industry that is set to boom in the foreseeable future. The demand for graduates of this area is both large and broad. Biomedical Engineering Program (B.S., M.S. and PhD) was approved to start in the Fall of 2006 in the College of Engineering and Computing at USC. These new degree programs are aligned with the mission of the University of South Carolina, as defined by the South Carolina Commission on Higher Education. These degree programs have been and will be directly contributing to economic development within the state by training a new workforce. Because of the close ties between biomedical engineering and the medical profession, including medical instrumentation, basic research in the clinical sciences, and development of novel procedures and techniques, this program is also expected to assist the medical community in the State. At the same time, there will be an increasing demand for members of the medical profession itself to be trained in engineering principles, in order to take advantage to the therapeutic potential of the burgeoning device / interventions industry.

The technology to produce medical devices and innovative medical interventions – biomedical engineering – is set to boom over the foreseeable future. The eventual annual market for regenerative medical technologies is estimated to reach $80 billion per year over the next 15-20 years. Biomedical Engineering research has already contributed to the development of dialysis machines, pacemakers, medical imaging devices, improved materials for hip and knee replacements, heart-lung machines, and advanced drug delivery systems. Additionally, basic research in biomedical engineering has expanded the understanding of normal and pathologic tissue development, and has helped to elucidate the complex relationships between biological, chemical and mechanical processes in living systems.

The Recent Past of BME at USC:

Five years ago, 2006, the Biomedical Engineering Program was proposed and approved by the South Carolina Commission on Higher Education. In order to build the

program from scratch, **FOUR** major tasks were undertaken simultaneously; faculty recruiting, undergraduate and graduate recruiting, building sound infrastructure for biomedical engineering research and teaching laboratories and striving for a reputable a scholarly program by conducting first class research with enough competitive external funding.

The Present and future of BME at USC:

Today, we have a program that offers a Bachelor of Science in Biomedical Engineering, Masters of Science in Biomedical Engineering and a Doctor of Philosophy in Biomedical Engineering degree programs.

Student enrollment substantially exceeds all expectations both in quantity and quality. Currently we have more than 200 undergraduate students and more than 35 graduate students. Our first BS class was graduated in May 2010. We have already graduated a few MS and PhD students. *It is anticipated that we may reach to about 300 undergraduates before it reaches to steady state.*

Currently we have 12 core faculty members and a few affiliate faculty members. All are actively teaching and pursuing research in biomedical engineering. The faculty body is collaboration between engineering, sciences and medicine. A BME laboratory manager was hired in order to develop state-of-the-art laboratory facilities for both teaching and research activities. *It should be noted that BME faculty members are shared between BME and their home departments with respect to teaching and service.*

Our program has received three major grants from the National Science Foundation to assist in hiring faculty and building the program's infrastructure. In 2006, $3.2M secured the hiring of four junior faculty members. In 2009, an additional $5.2M to, again, secure the hiring of 4 additional faculty members for the BME program in the area of bio-fabrication over the course three years. Other grants and recognitions have been obtained by individual faculty members to support their research endeavors. The program has received its first NSF REU Site this summer, its first NSF CAREER grant this summer, and a second NIH INBRE program for infrastructure.

It should be noted that space for classrooms, BME undergraduate labs and BME research labs were taken from either ME or ChE. It is very limited and it will not sustain the anticipated growth in enrollment or research labs.

We are currently involved in the development of inter-institutional initiatives that include MD/PhD, PHARMD/PhD and DMD/PhD programs with the USC's SOM and MUSC, collaboration with Clemson University and MUSC for a statewide-shared graduate course program, a facilitated/fast-track/guaranteed admission of BS-BME@USC into MD@MUSC and finally the development of an industry advisory board for the program.

SUMMARY: ACCOMLISHMENTS; GOALS; NEEDS

In summary, the program **ACCOMLISHMENTS** can be highlighted by the following:

- The undergraduate enrollment exponentially increases in number and quality: currently exceeds 200; incoming freshmen class for the fall of 2010 was 85 students (i.e. well above our original plans and expectations); incoming freshman for fall 2011 will exceed 100 (twice as much of our original proposal)
- Two new BME faculty members have joined the program in August 2010
- The first NSF REU Site for BME@USC began this summer 2010
- The first NSF CAREER award for BME has been granted
- Seven new research grants (NSF & NIH) were awarded in 2010
- State-of–the-art BME lab facilities for both undergraduate and graduate education/research have been developed and are now fully operational
- An industry advisory board is in place – its first meeting was on November 2010
- Our ABET first visit is scheduled for 2011

The short-term and long-term **GOALS** of the programs can be outlined in two main points:

- Biomedical Engineering has shown that it can strategically meet South Carolina goals for growth (enrollment and scholarly activities)
- Biomedical Engineering jointly with the USC School of Medicine does not only contribute the growth that we need but it could create a comprehensive and reputable Biomedical Engineering and Health Sciences thrust in the midland for better economic development

The program immediate **NEEDS** are:

- Faculty ~ not less than four members in the next two years in addition to the RII Hires
- Space ~ for both graduate and undergraduate programs
- Graduate assistantship ~ graduate fellowships to stimulate the graduate program
- Staff – an IT and an administrative assistance
- Operating expenses ~ teaching assistantship, supplies and other day-to-day expenses

ECHE Department Blueprint
October 2010

Approved by the Faculty October 10, 2005

A. Executive Summary

Vision. Our department will be renowned for education of undergraduate and graduate students, and for the quality and productivity of its faculty. Our faculty, students, programs, and physical assets will support our strategic focus areas. Our resources will be used by academia, industry, and government to solve problems that are of vital importance for the betterment of society.

Mission. We develop high quality chemical engineers by continuously improving our undergraduate and graduate programs. We conduct world class research and innovative teaching, provide an environment for professional development, and are an effective resource for industry, government, and academia.

Goals. 1. Within five years, increase productivity, impact, and quality metrics so that our department is in the top 20 Chemical Engineering Departments among public institutions.

2. Within three years, obtain one major, federally-funded pre-doctoral training grant (e.g. IGERT, GAANN, or NIH pre-doctoral grant).

3. Within four years, assure that every B.S.E. graduate has at least one significant and assessable beyond-the-classroom professional development experience.

Ranking Data: The 2010 National Research Council (NRC) rankings of PhD programs have just been published. Based on data primarily from 2005, these rankings indicate that the Department of Chemical Engineering has made major strides in research activity and reputation since the previous NRC report (published in 1995, based on 1993 data). The department was just beginning its major move to improve its PhD program in 1993, and we are gratified that the 2010 report shows the results of our efforts.

Selected data from the 2010 Report, for Chemical Engineering Departments, is summarized in Table 1 below. The S metric is a measure of the strength of a department in 20 characteristics such as publications per faculty member and time to degree. The R metric is an indirect approach to determining what faculty value in a program, and is based on a re-weighting of the 20 characteristics. The RA ranking reflects overall program characteristics such as publications, citations, the percent of faculty holding research grants, and recognition through honors and awards. The NRC ranked USC compared both to other Southern programs (Delaware to Texas) and against all U.S. programs.

Table 1 presents the ranking of USC Chemical Engineering compared to all universities, and to chemical engineering in public universities. South Carolina is ranked in the top 10 in the NRC Southern region, and in nationally ranks well inside the top 50. In the Southern region, Johns Hopkins is the only private school ranked above USC. Nationally, several private schools including Princeton, Carnegie Mellon, Northwestern, Cornell, and Yale rank above USC in the three rankings.

Table 1. USC Chemical Engineering Rankings from the 2010 NRC Study

	All Universities		Public Universities	
Metric	Southern	National	Southern	National
R	10	41	9	25
S	7	29	6	17
RA	6	30	5	15

While the NRC study is gratifying, it has several shortcomings. The first is timeliness: the last two NRC reports were 15 years apart, and the 2010 report is based on five-year old data. In addition, certain of the metrics used by NRC (e.g. percentage of students with academic plans, student work space, student health insurance, percent interdisciplinary faculty) are questionable measures of quality and impact.

To assess our current standing in greater depth, in early 2010 we undertook an independent study of impact (i.e. several metrics of total program size) and productivity (i.e. impact metric divided by number of tenured or tenure-track faculty). Note that this study is currently being expanded to additional years, and to gather at least one more quality indicator, namely the number of citations generated by the faculty. The comparison (peer) group is all state-supported departments whose graduate program is ranked in the top 50 or so by U.S. News & World Report (USNWR). To this comparison group were added a few unranked public departments whose research expenditures in 2006 (as reported by NSF) rank in the top 25 or so institutions. The USC Department is among these unranked departments. Our total and federal research expenditures have been in the top 25 of all U.S. institutions for about the last decade, but neither our graduate nor undergraduate programs are ranked by USNWR. We also examined, for comparison, impact and productivity metrics for eleven top-ranked private institutions.

The results are shown in the two attached tables. The Table 2 shows the USNWR rankings of both graduate and undergraduate programs, and all the data (the sources of data and our methodology are attached, and includes comments about uncertainty.) Table 3 shows the rank order of each school in each impact and productivity category (save post-doctoral students). Data in Table 3 were generated by multiple sorts of Table 2, by category.

Table 3 shows that the USC Department of Chemical Engineering is at, or inside, the top 25 in every measure of research impact and productivity, as shown by this snapshot based on 2006 and 2008 data for the selected public institutions. USC ranks 31st in undergraduate metrics (total number of B.S. graduates and B.S. graduates per faculty). While this is only a snapshot based on most recent data, we have tracked our productivity metrics for over 15 years and the data in Table 2 reflect recent performance (although 2008 was a low year for B.S. graduates as well as total PhD enrollment). Furthermore, these rankings of productivity and impact are roughly consistent with the NRC RA and S data.

We recognize that these metrics are not direct measures of program quality, and they are not direct measures of the reputation of our individual faculty. Additional metrics of program

Table 2. Data for Chem Eng Departments

	2010	2010		**Chemical Engineering Impact and Productivity Metrics-Public Universities**															
	USN&WR	USN&WR	2008	2006	2006 Res	2006	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	Metric
Dept.	Public Rank	Rank all	#TT Fac	#TT Fac	Exp	Exp/Fac	PhD Grad	PhD grad/fac	PhD Stu	PhD stu/fac	#USPhD	%USPhD	Post-D	Post-D/fac	articles	articles/fac	BS grads	BS/Fac	Rank
NC State	12	20	20	21	$16.5	0.79	13	0.650	93	4.650	46	49%	10	0.500	73	3.650	89	4.450	1
Penn State	13	21	15	17	$16.1	0.95	16	1.067	58	3.867	19	33%	10	0.667	74	4.933	98	6.533	2
Ga Tech	7	11	33	28	$14.9	0.53	31	0.939	136	4.121	56	41%	15	0.455	141	4.273	88	2.667	3
Texas-Austin	3	6	22	22	$13.9	0.63	21	0.955	117	5.318	74	63%	11	0.500	181	8.227	109	4.955	4
Arizona State	32	52	21	23	$12.7	0.55	1	0.048	38	1.810	17	45%	-1	-0.048	45	2.143	36	1.714	5
Ohio State	17	27	18	17	$12.3	0.72	11	0.611	68	3.778	26	38%	10	0.556	62	3.444	49	2.722	6
Clemson	38	58	10	13	$12.0	0.92	8	0.800	32	3.200	9	28%	-1	-0.100	32	3.200	27	2.700	7
Texas A&M	17	27	20	22	$11.1	0.50	20	1.000	66	3.300	10	15%	-1	-0.050	92	4.600	73	3.650	8
Mich State	28	47	28	26	$10.0	0.38	11	0.393	94	3.357	26	28%	15	0.536	64	2.286	42	1.500	9
S Carolina	**46**	**68**	18	18	$9.8	0.54	12	0.667	53	2.944	22	42%	14	0.778	63	3.500	24	1.333	10
Michigan	9	13	21	20	$9.7	0.48	18	0.857	98	4.667	61	62%	15	0.714	101	4.810	103	4.905	11
Minnesota	2	3	17	17	$9.6	0.57	32	1.882	132	7.765	69	52%	21	1.235	177	10.412	102	6.000	12
SUNY Buffalo	25	41	19	14	$9.1	0.65	6	0.316	57	3.000	14	25%	11	0.579	55	2.895	18	0.947	13
Nebraska	59	87	10	10	$8.5	0.85	1	0.100	13	1.300	7	54%	5	0.500	15	1.500	22	2.200	14
UC-Davis	19	30	31	30	$8.2	0.27	13	0.419	68	2.194	42	62%	12	0.387	114	3.677	35	1.129	15
Delaware	6	10	25	25	$7.6	0.30	12	0.480	112	4.480	75	67%	12	0.480	113	4.520	47	1.880	16
UC-SB	5	9	19	19	$7.5	0.39	15	0.789	71	3.737	53	75%	18	0.947	96	5.053	27	1.421	17
Wisconsin	3	6	19	19	$6.9	0.36	23	1.211	109	5.737	66	61%	12	0.632	101	5.316	65	3.421	18
Colorado	11	19	22	22	$6.9	0.31	13	0.591	93	4.227	76	82%	21	0.955	112	5.091	48	2.182	19
UC-Berkeley	1	2	18	18	$6.6	0.37	26	1.444	103	5.722	97	94%	-1	-0.056	154	8.556	78	4.333	20
Virginia Tech	19	30	12	11	$6.4	0.58	6	0.500	34	2.833	18	53%	2	0.167	36	3.000	48	4.000	21
Illinois U-C	7	11	16	16	$6.4	0.40	12	0.750	103	6.438	65	63%	18	1.125	60	3.750	64	4.000	22
Florida	15	23	22	22	$5.7	0.26	19	0.864	72	3.273	36	50%	1	0.045	136	6.182	66	3.000	23
Oklahoma	32	52	16	16	$5.2	0.33	5	0.313	21	1.313	5	24%	-1	-0.063	46	2.875	54	3.375	24
Pittsburgh	26	41	17	17	$4.6	0.27	10	0.588	42	2.471	16	38%	21	1.235	69	4.059	51	3.000	25
Washington	13	21	13	10	$4.6	0.46	7	0.538	62	4.769	44	71%	0	0.000	66	5.077	45	3.462	26
Purdue	10	15	19	19	$4.2	0.22	22	1.158	98	5.158	44	45%	12	0.632	75	3.947	76	4.000	27
Mass-Amherst	19	30	15	15	$3.4	0.23	7	0.467	63	4.200	22	35%	-1	-0.067	123	8.200	32	2.133	28
Iowa State	19	30	18	16	$3.3	0.21	7	0.389	46	2.556	23	50%	14	0.778	41	2.278	76	4.222	29
UCLA	15	23	12	12	$2.9	0.24	7	0.583	66	5.500	44	67%	-1	-0.083	83	6.917	46	3.833	30
Kentucky	53	79	21	21	$2.8	0.13	10	0.476	31	1.476	13	42%	6	0.286	68	3.238	29	1.381	31
UC-Riverside	38	58	14	14	$1.9	0.14	12	0.857	65	4.643	19	29%	-1	-0.071	75	5.357	25	1.786	32
Virginia	19	30	12	12	$1.7	0.14	11	0.917	44	3.667	21	48%	5	0.417	52	4.333	25	2.083	33
	Public=state schools only												-1: no data						

		2010		**Chemical Engineering Impact and Productivity Metrics- Selected Private Universities**															
		USN&WR	2008	2006	2006 Res	2006	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	Metric
Dept.		Rank all	#TT Fac	#TT Fac	Exp	Exp/Fac	PhD Grad	PhD grad/fac	Phd Stu	phd stu/fac	#USPhD	%USPhD	Postdocs	postdocs/fac	articles	articles/fac	# BS grads	# BS/Fac	Rank
MIT		1	30	29	$18.9	0.65	31	1.033	204	6.800	129	63%	68	2.267	234	7.800	24	0.800	1
Penn		16	12	12	$16.1	1.34	14	1.167	49	4.083	26	53%	16	1.333	52	4.333	37	3.083	2
Case Western		41	12	13	$11.2	0.86	9	0.750	33	2.750	20	61%	3	0.250	31	2.583	27	2.250	3
S Carolina*		**68**	18	18	$9.8	0.54	12	0.667	53	2.944	22	42%	14	0.778	63	3.500	24	1.333	4
Johns Hopkins		23	14	13	$9.6	0.74	9	0.643	59	4.214	40	68%	-1	-0.071	74	5.286	64	4.571	5
Princeton		6	17	15	$9.0	0.60	12	0.706	82	4.824	54	66%	16	0.941	125	7.353	34	2.000	6
Stanford		5	11	11	$8.9	0.81	12	1.091	101	9.182	76	75%	-1	-0.091	75	6.818	18	1.636	7
Northwestern		16	13	13	$6.1	0.47	20	1.538	87	6.692	65	75%	-1	-0.077	98	7.538	32	2.462	8
Rensselaer		27	15	15	$5.7	0.38	18	1.200	69	4.600	30	43%	3	0.200	73	4.867	45	3.000	9
Carnegie Mellon		15	19	18	$3.9	0.22	18	0.947	77	4.053	47	61%	17	0.895	110	5.789	58	3.053	10
Lehigh		41	13	13	$1.9	0.14	9	0.692	46	3.538	17	37%	3	0.231	63	4.846	35	2.692	11
Notre Dame		30	16	16	-$1.0	-0.06	12	0.750	54	3.375	32	59%	14	0.875	69	4.313	39	2.438	12

Table 3. Rank Ordering of Data

Public Schools

	2006 Res Exp	2006 Exp/Fac	2008 PhD Grad	2008 PhD grad/fac	2008 PhD Stu	2008 PhD stu/fac	2008 %USPhD	2008 articles	2008 articles/fac	2008 BS grads	2008 BS/Fac
1	NC State	Penn State	Minnesota	Minnesota	Ga Tech	Minnesota	UC-Berkeley	Texas-Austin	Minnesota	Texas-Austin	Penn State
2	Penn State	Clemson	Ga Tech	UC-Berkeley	Minnesota	Illinois U-C	Colorado	Minnesota	UC-Berkeley	Michigan	Minnesota
3	Ga Tech	Nebraska	UC-Berkeley	Wisconsin	Texas-Austin	Wisconsin	UC-SB	UC-Berkeley	Texas-Austin	Minnesota	Texas-Austin
4	Texas-Austin	NC State	Wisconsin	Purdue	Delaware	UC-Berkeley	Washington	Ga Tech	Mass-Amherst	Penn State	Michigan
5	Arizona State	Ohio State	Purdue	Penn State	Wisconsin	UCLA	Delaware	Florida	UCLA	NC State	NC State
6	Ohio State	SUNY Buffalo	Texas-Austin	Texas A&M	UC-Berkeley	Texas-Austin	UCLA	Mass-Amherst	Florida	Ga Tech	UC-Berkeley
7	Clemson	Texas-Austin	Texas A&M	Texas-Austin	Illinois U-C	Purdue	Texas-Austin	UC-Davis	UC-Riverside	UC-Berkeley	Iowa State
8	Texas A&M	Virginia Tech	Florida	Ga Tech	Purdue	Washington	Illinois U-C	Delaware	Wisconsin	Purdue	Purdue
9	Mich State	Minnesota	Michigan	Virginia	Michigan	Michigan	Michigan	Colorado	Colorado	Iowa State	Illinois U-C
10	**S Carolina**	Arizona State	Penn State	Florida	Mich State	NC State	UC-Davis	Michigan	Washington	Texas A&M	Virginia Tech
11	Michigan	**S Carolina**	UC-SB	Michigan	NC State	UC-Riverside	Wisconsin	Wisconsin	UC-SB	Florida	UCLA
12	Minnesota	Ga Tech	NC State	UC-Riverside	Colorado	Delaware	Nebraska	UC-SB	Penn State	Wisconsin	Texas A&M
13	SUNY Buffalo	Texas A&M	Colorado	Clemson	Florida	Colorado	Virginia Tech	Texas A&M	Michigan	Illinois U-C	Washington
14	Nebraska	Michigan	UC-Davis	UC-SB	UC-SB	Mass-Amherst	Minnesota	UCLA	Texas A&M	Oklahoma	Wisconsin
15	UC-Davis	Washington	**S Carolina**	Illinois U-C	Ohio State	Ga Tech	Florida	Purdue	Delaware	Pittsburgh	Oklahoma
16	Delaware	Illinois U-C	Illinois U-C	**S Carolina**	UC-Davis	Penn State	Iowa State	UC-Riverside	Virginia	Ohio State	Florida
17	UC-SB	UC-SB	Delaware	NC State	Texas A&M	Ohio State	NC State	Penn State	Ga Tech	Colorado	Pittsburgh
18	Wisconsin	Mich State	UC-Riverside	Ohio State	UCLA	UC-SB	Virginia	NC State	Pittsburgh	Virginia Tech	Ohio State
19	Colorado	UC-Berkeley	Ohio State	Colorado	UC-Riverside	Virginia	Purdue	Pittsburgh	Purdue	Delaware	Clemson
20	UC-Berkeley	Wisconsin	Mich State	Pittsburgh	Mass-Amherst	Mich State	Arizona State	Kentucky	Illinois U-C	UCLA	Ga Tech
21	Virginia Tech	Oklahoma	Virginia	UCLA	Washington	Texas A&M	Kentucky	Washington	UC-Davis	Washington	Nebraska
22	Illinois U-C	Colorado	Pittsburgh	Washington	Penn State	Florida	**S Carolina**	Mich State	NC State	Mich State	Colorado
23	Florida	Delaware	Kentucky	Virginia Tech	SUNY Buffalo	Clemson	Ga Tech	**S Carolina**	**S Carolina**	Arizona State	Mass-Amherst
24	Oklahoma	UC-Davis	Clemson	Delaware	**S Carolina**	SUNY Buffalo	Ohio State	Ohio State	Ohio State	UC-Davis	Virginia
25	Pittsburgh	Pittsburgh	Washington	Kentucky	Iowa State	**S Carolina**	Pittsburgh	Illinois U-C	Kentucky	Mass-Amherst	Delaware
26	Washington	Florida	UCLA	Mass-Amherst	Virginia	Virginia Tech	Mass-Amherst	SUNY Buffalo	Clemson	Kentucky	UC-Riverside
27	Purdue	UCLA	Mass-Amherst	UC-Davis	Pittsburgh	Iowa State	Penn State	Virginia	Virginia Tech	UC-SB	Arizona State
28	Mass-Amherst	Mass-Amherst	Iowa State	Mich State	Arizona State	Pittsburgh	UC-Riverside	Oklahoma	SUNY Buffalo	Clemson	Mich State
29	Iowa State	Purdue	SUNY Buffalo	Iowa State	Virginia Tech	UC-Davis	Clemson	Arizona State	Oklahoma	UC-Riverside	UC-SB
30	UCLA	Iowa State	Virginia Tech	SUNY Buffalo	Clemson	Arizona State	Mich State	Iowa State	Mich State	Virginia	Kentucky
31	Kentucky	Virginia	Oklahoma	Oklahoma	Kentucky	Kentucky	SUNY Buffalo	Virginia Tech	Iowa State	**S Carolina**	**S Carolina**
32	UC-Riverside	UC-Riverside	Nebraska	Nebraska	Oklahoma	Oklahoma	Oklahoma	Clemson	Arizona State	Nebraska	UC-Davis
33	Virginia	Kentucky	Arizona State	Arizona State	Nebraska	Nebraska	Texas A&M	Nebraska	Nebraska	SUNY Buffalo	SUNY Buffalo

Private Schools

1	MIT	Penn	MIT	Northwestern	MIT	Stanford	Stanford	MIT	MIT	Johns Hopkins	Johns Hopkins
2	Penn	Case Western	Northwestern	Rensselaer	Stanford	MIT	Northwestern	Princeton	Northwestern	Carnegie Mellor	Penn
3	Case Western	Stanford	Rensselaer	Penn	Northwestern	Northwestern	Johns Hopkins	Carnegie Mellor	Princeton	Rensselaer	Carnegie Mellor
4	**S Carolina***	Johns Hopkins	Carnegie Mellor	Stanford	Princeton	Princeton	Princeton	Northwestern	Stanford	Notre Dame	Rensselaer
5	Johns Hopkins	MIT	Penn	MIT	Carnegie Mellor	Rensselaer	MIT	Stanford	Carnegie Mellor	Penn	Lehigh
6	Princeton	Princeton	Stanford	Carnegie Mellor	Rensselaer	Johns Hopkins	Carnegie Mellor	Johns Hopkins	Johns Hopkins	Lehigh	Northwestern
7	Stanford	**S Carolina***	Princeton	Notre Dame	Johns Hopkins	Penn	Case Western	Rensselaer	Rensselaer	Princeton	Notre Dame
8	Northwestern	Northwestern	**S Carolina***	Case Western	Notre Dame	Carnegie Mellor	Notre Dame	Notre Dame	Lehigh	Northwestern	Case Western
9	Rensselaer	Rensselaer	Notre Dame	Princeton	**S Carolina***	Lehigh	Penn	**S Carolina***	Penn	Case Western	Princeton
10	Carnegie Mellor	Carnegie Mellor	Case Western	Lehigh	Penn	Notre Dame	Rensselaer	Lehigh	Notre Dame	MIT	Stanford
11	Lehigh	Lehigh	Johns Hopkins	**S Carolina***	Lehigh	**S Carolina***	**S Carolina***	Penn	**S Carolina***	**S Carolina***	**S Carolina***
12	Notre Dame	Notre Dame	Lehigh	Johns Hopkins	Case Western	Case Western	Lehigh	Case Western	Case Western	Stanford	MIT

quality are being compiled, including for example statistics on citations. Nevertheless, we believe that, based on this study and the NRC report, our program is clearly at least a "top 30" program nationwide among public institutions.

While the impact and productivity values themselves are around the top 25 to 30, note that our lowest research metrics are the total number of PhD students enrolled, PhDs supported per faculty, as well as total and per faculty journal articles. Also, the percentage of U.S. PhD students varies widely from year to year and this is a major concern of the faculty. National reputation, PhD productivity, and journal productivity and citation frequency are interrelated in a complex way. A strictly reputational ranking (like U.S. News and World Report, which uses no objective data) is not a goal that we can push directly. Therefore we must push on those metrics that we can influence. Given the relation between the department's reputation and faculty productivity on the one hand, and the number, quality, and productivity of its graduate students, on the other hand, two of our Goals are aimed at affecting this relationship.

Goal #1 is to improve our overall performance so that the quality and impact metrics are well within the top 20 among public departments. Lacking a sound, objective, and timely national ranking measure (NRC rankings are too infrequent), it will be up to us to identify the appropriate metrics, measure ourselves and others objectively, and then persuade sponsors, benefactors, alumni, government, and peers that we are indeed top 20.

Goal #2 is to improve the quality of our PhD program, and therefore our ability to recruit top candidates and make them more productive. We propose to do this by focusing in the short term on winning a major pre-doctoral training grant in one of our core areas. The effort and reforms needed to do this will elevate the entire department. We need to win recruiting battles for top students, and we can do this by providing cutting edge education and professional development to every student. We also want to improve the breadth of education by providing a more interdisciplinary research environment. Finally, we want to improve our financial competitiveness by providing incentives to top U.S. students.

Goal #3 will help us improve the quality and attractiveness of our individual B.S. graduates, and to increase the size of our B.S. class to a steady value of 40 Chemical Engineers per year.

Strengths: The departments' research strengths include large, well-established and recognized groups in electrochemical engineering and catalysis. The department is considered a leader, or major player, in the university's energy, biomedical, and nanotechnology initiatives. We have broad-based funding from both government and industry and have been in the top 20 in terms of research expenditures for approximately a decade. Our research productivity metrics (PhDs graduated, papers published, research expenditures) have us inside or near the top 25 (state-assisted) departments in the country on both a total and per TT faculty status. The faculty take pride in, and ownership of, the graduate program. We have an active and engaged graduate student group. Many of the faculty have national leadership positions (e.g. editorial boards, editorship, society leadership). Several of the university's COEES involve the department.

Strengths of the undergraduate program begin with a strong record of individual excellence: numerous NSF Graduate Fellows and winners of other major fellowships, and placement in top graduate and medical schools. There are many excellent teachers in the department, and most take great care in advising and mentorship. We have a strong record of undergraduate research and many students in the SC Honors College. Many of our students have

undertaken co-op experiences and participated in REUs at other universities. We have an active AIChE student chapter. We have been accredited by ABET with very few concerns. The Rothberg and other departmental scholarship funds are great assets. Upper-level courses such as the laboratory, separations, safety, and design have been well-spoken of by graduating seniors.

The top accomplishments in the past five years include (1) hiring talented new faculty; (2) contributing to the start-up of the BMEN program; (3) maintaining the university's first NSF-funded research center; (4) maintaining and actually increasing funding in very competitive times; (5) leading several successful COEE programs, NSF RII grants, and INBRE grants, with the associated faculty hires; (6) maintaining the NSF REU program; (7) Professor Van Brunt's winning of the university's Mungo Teaching Award; and (8) continued record of undergraduate student success with scholarships and fellowships.

Weaknesses, Threats, and Concerns: Past efforts to land an NSF Engineering Research Center, Materials Science Research Center, or other large programs have not been rewarded. Likewise, several efforts to land an IGERT have not been successful. Competition for grants is becoming increasingly stiff. The department and the college have not broken through in terms of major NIH R01 grants yet. The Biomedical Engineering component needs an established, funded senior leader or two with a national reputation. It is becoming increasingly difficult to recruit a sufficient number of strong domestic students to the program.

A major concern in the next handful of years is the increase in the number of required and elective courses we need to teach with the formation of the biomedical engineering program. This situation is accentuated by the ultimate loss of Professors Van Brunt and Stanford from teaching. It is unclear how we will go forward with the teaching of excellent design and safety courses, and provide an adequate number of electives for our graduate and undergraduate students. Although we are teaching more students, the number of BS chemical engineering graduates is too small to garner broad national attention from corporate recruiters. The opportunity to support the BMEN program is exciting and beneficial; however, the production of BMEN bachelor's degrees will not be recognizable in national databases or reputational rankings.

The department is out of space in the Swearingen building. The opening of Horizon I will provide space for some new hires and a very limited number of faculty who were here prior to Spring 2010. In addition, we are presently attempting to modify the building and to add storage for flammable gas cylinders, in order to meet new and anticipated safety and fire codes. The new INBRE Alteration and Renovations grant ($225k) will help renovate biomedical labs for 2-3 faculty in the college. This will not provide much relief or opportunity for chemical engineering research, however.

The research computing infrastructure is not nationally competitive. For teaching, classrooms are plain, unattractive, lacking in technology, and inferior to community colleges and probably many high schools. The number of support staff is small, and the planned increase in number of faculty, graduate students, and undergraduate students will tax our people even more. Splitting faculty and students between Swearingen and Horizon I will strain the staff even further. We do not have sufficient trained staff or funds to support outreach and PR efforts, including web pages, mailings, and brochures.

B. Goals, Strategies, and Action Plans

It is noted that the goals, initiatives, and action plans are complementary, as they should be. For instance, under Goal 1 the initiatives to increase the number, quality and productivity off PhD students also support Goal 2, to establish a large, federally-funded pre-doctoral training grant. In addition to refocusing the (limited) departmental resources, co-funding for these initiatives will be sought from the Office of the Dean and the Office of the Vice President for Research and Graduate Education. Funding can also be sought from corporate sponsors and through other development efforts. The University is set to embark on a new capital campaign in the next year or two. A well-conceived plan, backed by the faculty, its academic partners, and the upper administration will facilitate development efforts.

Goal 1: Within five years, to increase productivity, impact, and quality metrics so that our department is in the top 20 Chemical Engineering Departments among state-supported institutions. *{Achieving and promoting this goal will improve the renown of our department, aiding in the recruitment of PhD students, research associates, and faculty. Achieving this goal will drive faculty and students to higher productivity with higher quality. Achieving this goal, and publicizing it, will ultimately lead to higher reputational ranking}*

Productivity, quality and reputational rankings are very important in attaining all three goals. Demonstrated productivity and quality influence our ability to win major grant funding and recruit strong PhD students with a respectable fraction of U.S. citizens. In addition, rakings are important in recruiting undergraduate students, attracting companies that hire our students, and in development activities such as gifts for scholarships, fellowships, and infrastructure. A strong reputation helps us recruit new faculty and develop collaborations with other top institutions. Finally, a strong reputation in Chemical Engineering helps the University of South Carolina increase its stature and supports its efforts to develop a national statue in energy, biomedical research, nanoscience, and environmental sustainability.

Initiative 1a Increase the number of PhD graduates to one per year per faculty member, with 40% being U.S. citizens.

This number will include both ECHE and BMEN dissertations directed by ECHE faculty. High PhD productivity is essential to meeting our mission of educating chemical engineers for industry and the nation. Departmental and university rankings are enhanced with high PhD productivity. Many of our grants and contracts require U.S. citizens. This initiative requires several Actions to increase the number and quality of enrolled U.S. citizens.

> ***Action Plan 1.a.1*** *Modify the PhD program of study to improve flexibility and decrease the number of required courses to more closely match top-ranked peer departments.*
>
> This action will help students better align coursework with their research interests, improving productivity. This may decrease time to degree and will allow more time focused on research. This should be more attractive when recruiting top U.S. citizens.
>
> ***Action Plan 1.a.2*** *Define a regular set of graduate elective offerings, including interdisciplinary offerings with our strongest partner departments, and offer at least four graduate elective courses per year.*
>
> A reliable set of graduate electives has been a concern of past students. A reliable set of electives aligned with our strengths will

aid in increasing productivity and quality, help with recruiting, and provide a basis for pre-doctoral training grant applications, see Goal 3.

Action Plan 1.a.3 *Re-focus Swearingen/Honeywell and Cantey Fellowship funds for the purpose of attracting U.S. students to graduate school with enhanced stipends and educational allowances.*

Funds can be used for relocation expenses, stipend enhancements, a Teaching Fellows program, etc. This will make USC more competitive financially in recruiting.

Action Plan 1.a.4 *Institute a program where all students will receive enhanced Professional Development training. "Professional Development" means improving students' scholarly productivity by improving their ability to find and critically assess literature, think independently, and communicate effectively in their field. This also includes Instituting a program where a select number of highly qualified students may satisfy the Professional Development requirement by serving as Teaching Fellows.*

A guaranteed Professional Development program should be attractive to U.S. citizens, and also should provide a basis for developing pre-doctoral training grants, see Goal 3.Action plan 1.a.3 and 1.a.4 are coupled.

Action Plan 1.a.5 *Benchmark stipends and benefits to PhD students at top institutions, then develop and implement a schedule to increase stipends regularly to remain competitive.*

Stipends need to be nationally competitive, and allowances made in grant budgeting for inflation, for instance.

Initiative 1b Increase the number of peer-reviewed journal papers to an average of 5 per year per faculty member, with a focus on journals with high impact factors.

Peer-reviewed papers in high impact journals are another very important metric for strong departments. Strong journal productivity is required to win new grants. Equally as important, publishing journal papers is an essential component of graduate education, and thus our students are best served when they complete and publish a significant body of new knowledge in widely respected and read journals.

Action Plan 1.b.1= Action Plan 1.a.4 *Institute a program where all students will receive enhanced Professional Development training.*

Not only will a Professional Development program help in recruiting, it will accelerate student research productivity, specifically in their ability to conduct and communicate research, increasing the number of papers published.

Action Plan 1.b.2 *Raise the bar on the departmental PhD requirement for papers so that each PhD graduate must have at least one accepted journal paper, and three additional papers submitted.*

The current publication "bar" (minimum) is that all PhD students must submit three journal papers prior to being granted the PhD. While this bar had a strong impact several years ago when instituted, the number of journal papers published by the faculty has remained relatively flat despite growth in the number of faculty. Raising the bar,

combined with providing Professional Development training, will increase the number of journal papers.

Action Plan 1.b.3 *Examine the regulations and incentives regarding joint advising of PhD students. Seek to increase opportunities for working with a second advisor, especially those outside the Department of Chemical Engineering.*

It is believed that working with strong external collaborators will increase the number of top-quality students and the number of papers published. Tenure and promotion regulations and other policies, as well as historical and cultural matters, may actually discourage collaborations outside the department. These matters need to be investigated and, if substantiated, addressed appropriately.

Action Plan 1.b.4 *Establish a Professional Communications Center in the Department or College.*

Establishing such a Center will increase publication productivity, relieve some of the editing burden on the faculty, and will also be an attractive resource for recruiting students.

Action Plan 1.b.5 *Track Journal Impact Factors and Citations by Faculty, and make these an explicit part of annual reviews and promotion/tenure reviews.*

Tracking these metrics should encourage faculty and their students to aim for the highest impact journal possible.

Initiative 1c. Enhance publicity and outreach efforts. USC lags other top departments in promoting the accomplishments of its students and faculty.

Action Plan 1.c.1 *Convene an external group of advisors to develop a marketing plan. Follow up by working with the Dean to prepare the various materials to be disseminated. This Action includes improvement of the departmental web site.*

Action Plan 1.c.2 *Appoint a coordinator to nominate faculty for national awards, and for fellow (or similar) positions within professional societies.*

Action Plan 1.c.3 *Establish a named research seminar series to accompany the Neva Gibbons Educational Seminar, and aggressively promote both of these nationwide.*

Goal 2. Within two years, to obtain one major, federally-funded pre-doctoral training grant (e.g. IGERT, GAANN, or NIH pre-doctoral grant). *{Achieving this goal will establish USC Chemical Engineering as a national leader in one area of research and graduate education. This will improve the renown of the department, and will aid in recruiting highly qualified U.S. citizens.}*

The department (and the college and university) need long-term, stable funding for major team-based research projects. Large project funding is essential for solving some of society's most difficult projects. Establishing a nationally-recognized pre-doctoral training program may be a prerequisite to such funding. In addition, the steps taken to win such a grant will affect the overall culture of the entire PhD program. The Department has reached a size and maturity that it should be leading at least one such pre-doctoral training program. **Note that several of the initiatives and action plans listed under Goal 1 will also enhance our goal of winning a major pre-doctoral training grant. Additional initiatives and actions for Goal 2 now follow.**

Initiative 2.a. Identify one or two target areas where Chemical Engineering can lead a major pre-doctoral training grant.

There are many strong individual programs and small groups in the department. Valiant efforts have been made in the past to win an IGERT, without success. We believe that promising areas should be identified with the help of impartial experts, and that a long-term effort must be incentivized, seeded, and followed.

> ***Action Plan 2.a.1*** *Convene a panel of advisors, both internal and external, to review departmental strengths, promising partnerships, leading to identification of realistic opportunities for a training grant.*
>
> An outside panel of experts (IGERT winners, former program managers, leaders in the field) will provide perspective that is not available from the departmental faculty. They will help identify the highest probabilities for success, and will advise and critique the proposals for pre-doctoral training.
>
> ***Action Plan 2.a.2*** *Select proposal leaders and empower them to go after the center for the next four years. Obtain support for released time, travel/development funds, seed funds for innovative courses, consultants, etc.*
>
> Efforts to date to win an IGERT have been undertaken by faculty as an overload, on top of other responsibilities. This approach has not worked to date. The effort in communicating, traveling, partnering etc requires dedicated time.
>
> ***Action Plan 2.a.3= Action Plan 1.b.3*** *Identify barriers to collaboration, and overcome these so that a more collaborative culture results.*
>
> Just as collaboration is important to increasing productivity, it is essential to establishing the research and educational programs needed to win a high-profile pre-doctoral training grant.

Goal 3: Within four years, assure that every B.S.E. graduate has at least one significant, beyond-the-classroom professional development experience. *{Achieving this goal will improve the quality of our undergraduate program and distinguish it so that we can recruit more, highly qualified students.}*

Many of our students do undergraduate research, take co-ops, or graduate from the SC Honors College. However, not all students take advantage of opportunities for beyond-the-classroom education, where skills such as leadership, communication, teamwork, and problem-solving are honed. Such skills are vital to success whether in the chemical industries or in further professional education. Achieving this Goal will provide students with valuable skills, making our students more valuable to employees. Furthermore, achieving this goal will help distinguish USC Chemical Engineering to prospective students and their families. Furthermore, this initiative is consistent with USC's new Quality Enhancement Plan and with its revised Carolina Core (general education) curriculum.

Initiative 3.a. Define the term "beyond-the-classroom (BTC) experience" and establish a menu of acceptable options and opportunities for students in our program.

> ***Action Plan 3.a.1*** *Task the Undergraduate Curriculum Committee with formulating the program options, including a method for assessing and insuring meaningful BTC educational experiences.*
>
> ***Action Plan 3.a.2*** *Designate a faculty coordinator for BTC activities, and define responsibilities of this coordinator.*

Action Plan 3.a.3 *Educate all faculty advisors on the BTC goal and provide advising tools and checks for use both by ECHE advisors and CEC student services.*

Initiative3.b. Increase the number of BTC opportunities for our undergraduate students.

Action Plan 3.b.1 *In addition to ongoing activities such as REU and research in faculty labs, work with CEC Career services to increase the number of co-op and intern positions are needed.*

Action Plan 3.b.2 *Enlist active participation by the Industrial and Research Advisory Boards in providing opportunities for our students.*

Action Plan 3.b.3 *Seek funding for BTC scholarships for transfer students.*

Initiative 3c. Increase the number of B.S. graduates in Chemical Engineering to 40 per year.

This is also an "impact" initiative. This level of B.S. productivity would put us just inside the top 25 among public institutions. For a variety of reasons USC will not, in the next five years, reach top 15 or top 10 in terms of B.S. productivity (50 to 75 graduates/year). It should be noted, however, that our department also supports the B.S. degree in Biomedical Engineering, and the number of graduates there will increase in the near future. Our support of the BMEN program should be recognized internally by the university administration.

Action Plan 3.c.1 *Aggressively market the Degree with Distinction.*

```
To recruit top students it is believed that they need to be
challenged. The Honors College opportunity has helped us land many top
students, and the Degree with Distinction should provide similar
incentive.
```

Action Plan 3.c.2 *Develop a set of elective tracks aligned with our expertise and national needs, offer these electives regularly, and publicize these opportunities.*

```
A reliable set of undergraduate electives has been a concern of past
students. A reliable set of electives aligned with our strengths will
help distinguish our UG program and should help with recruiting.
```

SUMMARY OF BLUEPRINT GOALS, INITIATIVES, AND ACTION PLANS

Goal 1: Within five years, increase program metrics so that our department is in the top 20 Chemical Engineering Departments among state-supported institutions.

Initiative 1a Increase PhD graduates to 1/year/ faculty; and 40% U.S. citizens.
- ***Action Plan 1.a.1*** *Modify the PhD program of study.*
- ***Action Plan 1.a.2*** *Offer four graduate electives/year; include interdisciplinary.*
- ***Action Plan 1.a.3*** *Re-focus Swearingen/Honeywell and Cantey funds on U.S. students.*
- ***Action Plan 1.a.4*** *Institute Professional Development training for all graduate students.*
- ***Action Plan 1.a.5*** *Increase stipends; benchmark against top-ranked peer departments.*

Initiative 1b Increase papers to 5/year/ faculty member, in high impact journals.
- ***Action Plan 1.b.1= Action Plan 1.a.4*** *Institute Professional Development training.*
- ***Action Plan 1.b.2*** *Raise the departmental PhD publication requirement.*
- ***Action Plan 1.b.3*** *Examine incentives for joint/interdisciplinary advising of PhD students.*
- ***Action Plan 1.b.4*** *Establish a Communications Center in the deparment/college.*
- ***Action Plan 1.b.5*** *Use Journal Impact Factors and Citations for review and promotion.*

Initiative 1c. Enhance publicity and outreach efforts.
- ***Action Plan 1.c.1*** *Convene an external group of advisors to develop a marketing plan.*
- ***Action Plan 1.c.2*** *Appoint a coordinator to nominate faculty for major awards.*
- ***Action Plan 1.c.3*** *Establish a named research seminar series.*

Goal 2. Within two years, to obtain one major, federally-funded pre-doctoral training grant (e.g. IGERT, GAANN, or NIH pre-doctoral grant).

Initiative 2.a. Identify one or two target areas to lead a major pre-doctoral training grant.
- ***Action Plan 2.a.1*** *Convene a panel of advisors to identify opportunities.*
- ***Action Plan 2.a.2*** *Select and empower proposal leaders.*
- ***Action Plan 2.a.3= Action Plan 1.b.3*** *Identify and overcome barriers to collaboration.*

Goal 3: Within four years, assure that every B.S.E graduate has at least one significant, beyond-the-classroom (BTC) professional development experience.

Initiative 3.a. Define BTC and establish a menu of options and opportunities.
- ***Action Plan 3.a.1*** *Task the Undergraduate Committee to define BTC.*
- ***Action Plan 3.a.2*** *Designate a faculty coordinator for BTC activities.*
- ***Action Plan 3.a.3*** *Educate faculty advisors and Student Services on BTC.*

Initiative 3.b. Increase the number of BTC opportunities for our undergraduate students.
- ***Action Plan 3.b.1*** *Work with CEC Career services to increase the number of opportunities.*
- ***Action Plan 3.b.2*** *Enlist help of Industrial and Research Advisory Boards.*
- ***Action Plan 3.b.3*** *Seek funding for BTC scholarships for transfer students.*

Initiative 3c. Increase the number of B.S. graduates in Chemical Engineering to 40 per year.
- ***Action Plan 3.c.1*** *Aggressively market the Degree with Distinction.*
- ***Action Plan 3.c.2*** *Offer elective tracks aligned with expertise and national needs.*

Update on Blueprint from

Civil and Environmental Engineering

18-Feb-2011

Goal 1: Cultivate and recruit the next generation of College leadership at all levels

Initiative 1(a): Associate Dean and Department Chair searches COMPLETE

Initiative 1(b): Develop a practical, metrics-driven five year strategic plan for the College

The department has concentrated on specific action items in anticipation that the new dean will initiate a strategic planning effort for the College.

Initiative 1(c): Initiate efforts to acquire new physical space for teaching and research.

The department has found space for the student concrete canoe and steel bridge team in a building three blocks from the engineering school. This space is being provided to the students by SM&E (a local engineering firm).

Several laboratories have undergone a cleanup to dispose of old items. The geotechnical lab space will be next.

The department is looking for a "computational mechanics office" for graduate students in the Catawba building (request pending with the dean)

Goal 2: Increase enrollment in both undergraduate and graduate degree programs.

Initiative 2(a): Initiate strategic planning for undergraduate enrollment growth.

Statics and Dynamics have been taught independently by the CEE and ME departments. This fall, we are piloting a plan to combine the course such that CEE teaches Statics and ME will teach Dynamics. The quality of the courses will be ensured by additional TA support (from the Dean). This (and similar) items will improve the efficiency of faculty time and allow enrollment growth to occur without a decrease in faculty research

Initiative 2(b): Initiate strategic planning for graduate enrollment growth.

(need more office space for graduate students*)*

Goal 3: Increase our research performance and productivity (based on quantifiable metrics other than reputational surveys) to a top 50 position nationally, and a top 10 position in the Southeast, within five years.

Initiative 3(a): Develop a metrics-driven five year strategic plan for increasing research performance and productivity
Action was delayed until the Dean arrived.

Initiative 3(b): Increase the size and continue to improve the quality of the faculty.

Two faculty were hired in CEE this academic year (Song January 2011 and Liu August 2010) A search for additional faculty in water resources and a replacement for Prof. Baus who retired are underway.

Initiative 3(c): Improve the quality and continue to increase the quantity of the research conducted in the College.

Shared research equipment in the Geotechnical Engineering and Structural engineering labs have been upgraded. The environmental engineering equipment was upgraded previously. Faculty were spending to much time keeping very old equipment functioning. These upgrades should increase efficiently in faculty time conducting research. Addition technical support was added to also utilize experimentally based research in the department.

Initiative 3(d): Increase the number and improve the quality of PhD students.

Completed a graduate student handbook to improve the advising and mentoring of graduate students.

Computer Science and Engineering

I. Executive Summary

During the past five years, the Department of Computer Science and Engineering has increased its undergraduate and Ph.D. enrollments steadily, greatly increased its research funding, and increased its graduation of Ph.D. students. By all metrics, it is the top program in South Carolina in computing.

A strength is the active engagement in research—and concomitant success—achieved by *all* faculty members in the Department.

A weakness is the lack of any large multi-investigator research grants: most research projects involve just one or two faculty members. A goal is to remedy this by writing and submitting proposals to larger funding programs.

II. Goals

A. Five-Year Goals for the Department of Computer Science and Engineering

- Form and institutionalize an academic (Virtual) School of Computing, which will provide an organizational and coordinating structure for computing activities across the University.
- Found and obtain funding for an NSF-sponsored research center, most likely in one of the following areas: computational biology, information assurance, and social computing.
- Increase the research funding, published papers, and Ph.D. students per faculty member by 50%.

B. Short Term Goals for the Department of Computer Science and Engineering

- Initiate and obtain formal approval for a (Virtual) School of Computing

  Progress: a draft proposal for the School has been written and concurrence has been obtained from the Dean of Engineering and Computing and from the Provost.

Electrical Engineering Department Submission

for the College Blueprint

February 18, 2011

I. Executive Summary

A. Top Ten Colleges in Electrical Engineering (EE): US News and World Reports 2009 rankings: *Best Colleges Specialty Rankings: Undergraduate Engineering Specialties: Electrical /Electronic /Communications*

1.	Massachusetts Institute of Technology	NRC*, ranked 6-18
2.	Stanford University	NRC, ranked 1-3
3.	University of Illinois--Urbana-Champaign	NRC, ranked 4-13
4.	University of California—Berkeley	NRC, ranked 7-26
5.	Georgia Institute of Technology	NRC, ranked 8-30
6.	University of Michigan--Ann Arbor	NRC, ranked 8-27
7.	California Institute of Technology	NRC, ranked 4-8
8.	Cornell University	NRC, ranked 13-43
9.	Carnegie Mellon University	NRC, ranked 20-54
10.	Purdue University	NRC, ranked 8-26

University of South Carolina, Columbia, SC **In NRC, ranked 4-17**
(All above are "S" rankings)

* NRC (National Research Council)

Five Colleges who are our peers:

1.	University of Arkansas	NRC, ranked 11-41
2.	Mississippi State U.	NRC, ranked 129-134
3.	University of Missouri	NRC, ranked 92-126
4.	University of Iowa	NRC, ranked 23-62

University of South Carolina, Columbia, SC **In NRC, ranked 4-17**
(All above are "S" rankings)

B. EE's top strengths and important accomplishments in the last five years:

- World Class programs in Wide Bandgap Semiconductors; evidenced by Visibility, Recognition, Publications, PhDs, Post Docs, and Grants
- Demonstrated transition of the research program into the commercial domain: SET, BGT (now CREE), and Nitek. Significant impact on economic development. At USC, the EE department has been rather unique in this respect, in spite of being a small department.
- Strong research programs in simulation environments and smart antennae.

- Significant revisions to the undergraduate curriculum with more hands-on laboratory experiences starting with ELCT 101 aimed at improving retention.
- Revamping of our undergraduate laboratory program offering greater hands-on experience for students with the hiring of David Metts, EE Laboratory Manager
- Project-based undergraduate labs starting with the first lab, ELCT 201.
- Streamlined EE office for efficiency and productivity.
- Department policies and procedures are in place; for example, regular faculty peer review, buyout policy, publications database, T&P schedule, exit interviews, alumni surveys, faculty meeting minutes, etc.
- Excellent *intranet*-based ABET process aimed at automatic preparation of self-study report. The system now has a permanent place on our intranet to continually monitor the status and allow for planning for future improvements; historical data are stored securely.
- Created a completely new IAB that is fully engaged and keen to help improve our program and to enhance the stature of the department.
- Made significant progress in bolstering the undergraduate scholarship fund.

C. EE's department weaknesses:

- Funded research is narrowly secured by few faculty members.
- Historically, funding numbers have looked good because of a few very large grants generated by a very few people. Funding needs to be more evenly distributed, secured by all faculty. This situation is getting better. Considering that we have 3 new faculty who are striving hard to get funding, currently we have 7 out of 14 with very decent funding. This number should grow to as close to 14 as possible.
- Lack of critical number of faculty in certain areas; Antennas/Wireless (Dr. Ali), Power, Energy, and Control Systems (Dr. Dougal).
- Lack of optimal collaboration between different research areas.
- A significant number of our undergraduates are ill-prepared, with very weak mathematical foundations, which makes it difficult to retain them. It also undercuts efforts to recruit students into the research areas. TUTORING – NEW 101 – 401 RELATIONSHIP
- Inability to attract good US graduate students to our graduate programs, although we are making some headway here.
- Small size of Faculty causes a variety of difficulties, including heavy teaching load, subcritical mass for research, limited number of graduate classes being offered, and low visibility.

Plans to address weaknesses:

- Continue to increase undergraduate enrollment while improving student quality through scholarships and personal marketing.
- Streamline the UG curriculum to give students greater flexibility. Currently, the curriculum is too restrictive with very many prerequisites
- Diversify funding sources for research.
- Create shared equipment facilities for Research and Teaching.

- The department has made significant strides in this direction. The "Device Fabrication Clean Room Facilities" belonging to Prof. Sudarshan is now shared by many EE professors. This lab is managed by Prof. Zhao. Prof. Sudarshan's "Material and Device Characterization Lab" in Room 2D15 is also shared by many EE faculty. The Swearingen 3D38 Clean Room is also a shared facility; equipment needed to make this facility fully functional are pursued through Congressional funding, DURIP, and Keck Foundation.
- Increase total size of EE faculty to 20 in the next three years with focus on hiring faculty in the areas of (a) Biomedical sensors, imaging, implantable devices, etc., (b) RF and wireless, and (c) Power, Energy, and Controls. Strategic hiring in the above areas is essential to attain a critical mass of faculty to significantly impact our standing internationally in at least two significant areas of research. Priority should be given to hiring faculty with a track record at Associate Professor level to achieve intended impact in a short period of time.
- Improve visibility of Department and College through invited speakers, hosting of national and international workshops, conferences, etc.
- Recruit excellent graduate students. Approach: Create a departmental fund to support grad students for 1-2 semesters before they are picked up by individual professors. Action Item: Grad Committee will make recommendations with specifics on the number of students to be admitted next year and the budget requested from the department.
- Provide College support to enable submission of large collaborative grants; small and large research center type proposals.
- Secure university support (funding) to organize international workshops and conferences. Good for publicity and brings visibility to USC.
- Increase teaching lab space and support.
- Commit to improving our academic standards to the point where we are attracting and producing world-class faculty i.e. USC should be exporting faculty to the country. This will inevitably improve our national rankings.

II. EE Goals

A. Five-Year Goals

Goal 1 - To be recognized internationally in at least two areas of research: hire at least 3 targeted EE faculty in the fields of RF/Wireless and Sensors.
Goal 2 - Create high expectation for faculty productivity: 4 PhD students per faculty actively supervised; research expenditure of >$200K/year/faculty; 1 publication/year/student in top journals.
Goal 3 – Increase graduate enrollment: focus on recruiting more (a) US citizens for the PhD program, and (b) tuition paying MS and ME students globally: find resources to open the UG micro-fabrication lab run by a laboratory manager.
Goal 4 – Find ways to become more productive with no increase in manpower. For example, more common courses across the college

A. 2011-2012 Academic year Goals

Goal 1 - Add faculty in RF/ Wireless.

Progress: Numerous applications have been received for a position in this area, and we are in the process of evaluating the applicants and interviewing by Skype to determine what candidates we want to invite to the campus.
Goal 2 - Find resources to fund new graduate students for one to two semesters
Goal 3 - Complete overhaul of the T&P criteria.

Blueprint Mechanical Engineering Input

Summary Statement from Mechanical Engineering:

- The department is the home to the largest undergraduate program in the college with 420 undergraduate students. During the last ABET visit in 2006, this number was 287, i.e., we saw a 45% increase in the undergraduate enrolment.
- The department now puts more emphasis on doctoral education. We currently have 52 PhD students (40 are on campus) and 35 MS/ME students (18 are on campus), the number of PhD students have doubled in the last 5 years.
- Our Nuclear Engineering program has 76 actively enrolled graduate students; 15 are PhD students (5-on campus), the remaining 61 are MS and ME students.
- The department houses Mechanical, Nuclear and part of Biomedical Engineering program. The current total tenure track faculty number is 26; 4 in Biomedical (Prof. Bayoumi is the Director of the program), 2 in Nuclear, and 20 in Mechanical Engineering (Profs. Reifsnider, Lyons, and Giurgiutiu have significant administrative responsibilities). One of the 26 (Prof. Morehouse) will retire on Dec 31, 2011.
- Current external funding is one of the highest in the college; last year's research expenditure was about $ 5.5 million.
- *Primary goals for the department*
    - Hire tenure track faculty to bring the number of faculty to 30
    - Support aerospace industry in the state and initiate a minor in aerospace engineering
    - Submit more proposals for external funding, increase the funding level to $ 200k/faculty
    - Be a part of a major competitive IGERT and Center Initiatives.
    - Increase the number doctoral students graduated per year to 12
- *Major Challenges facing the department are*
    - The number of faculty, specifically in ME core areas and Nuclear Engineering
    - Laboratory, office, and classroom space
    - Lack of new faculty start-up funds

SPECIFIC QUESTIONS FOR ME

1. Which universities in the United States have the top 10 departments.

   In Mechanical Engineering:

   MIT
   UC Berkley
   U Michigan
   Stanford U
   GA Tech
   Caltech
   UIUC, Urbana Champagne
   Purdue U
   UT Austin
   RPI

   In Nuclear Engineering:

   MIT
   UIUC
   U Michigan
   UC Berkley
   U Wisconsin – Madison
   PennState
   Florida
   NC State
   Purdue
   Texas A&M

2. Which five departments at other United States universities are considered to be your peers.

   In Mechanical Engineering:

   Drexel
   Washington State
   U Conn
   Central Florida
   University of Alabama Huntsville
   U Tennessee

   In Nuclear Engineering:

   NC State
   GaTech
   U Tennessee

3. Department's top strengths and important accomplishments achieved in the last five years.

   The top strengths are:
   i. Quality of in-class instruction

ii. Future Fuels, specifically related to high temperature materials research for SOFC
iii. Experimental mechanics (fracture mechanics, Digital Image Correlations)
iv. Structural Health Monitoring and Condition Based Maintenance
v. Joining, specifically Friction Stir Welding and processing
vi. Nuclear Fuels Research

Important accomplishments are:

a. Impressive NRC ranking
b. Significant increase in undergraduate and PhD enrolments
c. Research funding up by 30%
d. Award of EFRC
e. Home of NSF-IUCRC in friction stir welding
f. Significant funding increase in CBM
g. Being awarded an NIH RO1 grant

4. Challenges:

Difficulty:

i. The department is spread thin, our faculty covers three different programs. As a result teaching load is high and the undergraduate class sizes are getting large. Some classes are being taught on the main campus. With no grader support this difficulty hinders research productivity
ii. Laboratory space
iii. Difficulty in attracting quality graduate students

Weaknesses:

a. Lack of faculty in some core areas of mechanical engineering (controls, design, fluids)
b. Lack of properly equipped labs and support for research computing
c. Insufficient IT support

5. Describe the department's top goals and priorities

i. for this year and the next
    i. Hire 5 tenure track faculty members (core ME area, aerospace, structural health monitoring, Nuclear, Composites, and Biomedical)
    ii. Support educational and economic activities associate with the location of the aerospace industry (Boeing and other suppliers) in the state
    iii. Try to identify and hire COEE Endowed Chair in Nuclear Engineering
    iv. Initiate a minor in Aerospace Engineering
    v. Actively recruit undergraduate and graduate students
    vi. Increase the number of PhD graduates

ii. for the next decade
    i. Stabilize the number of faculty at 35
    ii. Initiate MS and ME programs in Aerospace Engineering
    iii. Increase and maintain funding level to $ 200 k/faculty
    iv. Be ranked in the top 10 ME program in the South

Continuing Education

2011-2012 Academic Year Goals

Progress

- Planning for an Executive Master of Engineering Management program with instruction on two weekends (Friday/Saturday) and via distance education is continuing
- APOGEE program for continuing education is becoming stagnant because of our out-of-state tuition being almost double that of other regional and national competitors and because of limited new potential candidates in the state.
- PLTW program has been successfully run during summer for the in-state and out-of-state high school teachers and short courses have been organized for the certification of technical personnel of SCDOT and their contractors.

Plans

- A proposal on Planning Summary for Master of Engineering management to be submitted to the Provost by March 1 for review for possible submission to CHE this spring.
- Explore possibilities for incorporation of recent technologies which will allow offering of more graduate APOGEE courses than at present.

International Programs

Progress

In addition to typical study-abroad and faculty and staff exchanges, following MOUs and Agreements have been finalized for international collaboration and for increasing undergraduate and graduate enrollments:

- Fully-supported doctoral students: Egyptian Cultural and Educational Bureau; University of Jordan
- Joint BS-degree programs, UPC, Lima, Peru; University of Virgin Island
- Dual-Degree BS/MS programs: National Taiwan University and National Tsinghua University, Taiwan
- Dual-Degree MS Program: Tsinghua University, China.
- Summer Internships for foreign students to USC : Higher Technological Institute, Egypt and National Taiwan University, Taiwan

- Summer Internships for CEC Students: Catholic University of Louvain, Belgium; Instituto Superior Tecnico, Portugal; University of Osaka, Japan
- Successful live, two-way audio-video delivery of a graduate course to two institutions in Asia and Africa on an experimental basis.
- CEC is the only engineering program in the Southeast and one of four in the nation to be awarded NSF 5-year, 2.5 million dollar PIRE grant (with additional $400,000 in NSF supplement) since the initiation of this program about ten years back.

Goals

- The afore-mentioned collaborative relationships to be expanded and strengthened and new opportunities are being/to be explored with Cairo University, University of Puerto Rico, Mayaguaz, Monterray Tech., Guadalaraja, Helwan university, Egypt, and with other institutions of higher education.

5-year Goals

- The collaborative relationships listed in the Section 2011-12 to be expanded and strengthened and new opportunities to be explored.
- Live audio/video broadcast of several graduate courses to institutions in all six continents.
- Active Dual-degree MS/Ph.D program with several institutions, including joint courses and thesis committees.
- Live audio/video delivery of MS in Engineering Management foreign sites in four continents.

Executive Summary

A number of MOUs have been signed with foreign institutions and governmental agencies for international collaboration for research and education with plans for expending and strengthening these relationships and developing new opportunities in the future.

A new executive program for MS (Engineering Management) with instruction during two days per month as well as via distance education is being planned with a goal of enrolling the first class during the fall semester, 2012.