

COLLEGE OF ENGINEERING & COMPUTING

Blueprint for Quality Enhancement

March 18, 2009

2009 Update of the College's Blueprint

Long term strategic planning – such as the one represented by the “Blueprint” approach at USC – can be effective only if it is indeed long-term in its basic core. Hence, while we view this blueprint as a “living”, “breathing”, and hence, continuously adjusting document, we also see a lot of value in this process in continuity and stability, especially when it comes to the basic elements of the plan. We further believe that progress and changes need to be clearly and continuously documented over the course of time, so that the reviewer of such a document can follow both with ease.

*As a result, we have decided once again to present the annual version of the blueprint in the context of the original 2007 version and the 2008 revision. We use the previous documents as the starting point, and we intermit (with a special designation **09C** and in *italics*) comments regarding the progress made during the last year toward the different goals and the successes/failures of the various initiatives and plans. Adjustments to these plans are also addressed in a similar fashion.*

As is pointed out in the text below, in the next six months we need to redefine our major goals. As a result, we anticipate that this is the last year that this version of the Blueprint is used for the College and a different version will be prepared in 2010.

Vision, Mission and Goals

A. Executive Summary

The **vision** of the College of Engineering and Information Technology is to become: a worldwide recognized Center of Research Excellence in at least three important areas; the destination of choice in the Southeastern United States for students seeking both graduate and undergraduate degrees in engineering and computing; and a critical component of economic development in the region.

While some of the College's research efforts are currently recognized at an international level, critical mass and a strategic focus are needed in order to realize the first component of this vision. The College is effectively competing for a percentage of the engineering and computing students in South Carolina, but needs to increase both the in-state and out-of-state recruiting efforts before it becomes a true destination of choice. Finally, the College is currently contributing to the economic development of the region, but can increase further its role and visibility.

The **mission** of the College of Engineering and Information Technology is to develop high quality engineers and computing professionals by continuously improving its graduate and undergraduate programs, to conduct world-class research and innovative teaching, and to be an effective resource for industry, government and academia.

The College's vision is intimately linked with its mission. Performing its mission effectively and at the highest level of quality will allow the College to also realize its vision.

Specific **goals** of the College include:

1. Increase the number of undergraduate students by 25% by 2010.
2. Receive a US News & World Report top 10 ranking for graduate studies and research among Engineering and Computing Colleges in the Southeast by 2012 and a top 5 ranking by 2017.

08C: The College's Vision, Mission and Goals remain unchanged. Since the submission of the 2007 blueprint, the two specific goals of the College have been frequently communicated to different constituencies (e.g., faculty, students, alumni, advisory bodies) and have received strong universal support and approval from these constituencies.

09C: *The College's Vision, Mission and Goals remain unchanged. This is the last year however, for the two specific goals of the College outlined above. Based on the most recent admission, transfer and retention data, we expect that the first goal (i.e., 25% increase in the number of undergraduate students) will be met – and possibly exceeded – one year ahead of the target date. Hence, in the next six months the College will have to identify its next target in terms of undergraduate education.*

Furthermore, the budget cuts experienced in the last eight months have significantly slowed down the hiring of new faculty members in the College. Comparative data clearly demonstrate that without a significant increase in its faculty size, the College can not reach its ranking goal for graduate education and research within the specified time limits. Hence, in the next three months the College will have to redefine its research and graduate education goal(s)..

B. Goals, Initiatives and Action Plans

Goal 1: Increase the number of undergraduate students by 25% by 2010.

This goal is intimately related to elements of both the College's mission (i.e., develop high quality engineers and computing professionals; be an effective resource for industry, government and academia) and vision (i.e., become the destination of choice in the Southeastern United States for students seeking both graduate and undergraduate degrees in engineering and computing). This goal is also related to the financial viability of the College under the University's current fiscal model, due to the importance of the tuition generated. *It is critical that this goal is achieved without sacrificing the quality of students and instruction.*

08C: Undergraduate enrollment data for the last four Academic Years are shown in Table 08C-1 below. The data indicate a 7% increase in undergraduate enrollment for

the Fall 07 semester, bringing the number of students up to 1,345 from the baseline value of 1,258 (Fall 06). A similar 7% increase was also observed between the Spring 07 and 08 semesters.

Table 08C-1: CEC Undergraduate Enrollments

	AY 04-05	AY 05-06	AY 06-07	AY 07-08	AY 08-09
Fall semester (Average SAT)	1,371 (1211)	1,269 (1212)	1,258 (1220)	1,345 (1203)	1,454 (1219)
Spring semester	1,280	1,201	1,151	1,231	1,372

The increase in enrollments also resulted in a small increase in tuition revenue estimated to be of the order of \$180,000 for AY 07-08. Finally, we should point out that no significant change was observed in the quality of the students enrolled, consistent with our goal of increasing enrollments without sacrificing the quality of students and instruction.

09C: *Table 09C-1 has been revised to include data for AY 08-09. Furthermore, SAT average scores for incoming freshmen have been included. The data indicate a 8% increase in undergraduate enrollment for the Fall 08 semester over the previous Fall, bringing the number of students up to 1,454 from the baseline value of 1,258 (i.e., an increase of approximately 16%). Finally, the SAT scores indicate that these increases have been achieved without a negative effect on the quality of the students admitted to the College.*

Current admission data for Fall 2009 indicate an increase of approximately 19% in admitted students over the corresponding number for Fall 2008. Furthermore, we expect that the yield of enrolled freshmen will at least remain the same – if not increased – given the strong emphasis placed on recruiting freshmen in several of the academic Departments. Finally, the enrollment for Spring 2009 has proportionally increased more than the enrollment for Fall 2008, indicating an increase in retention rates, as well as transfer students. All these indicators suggest that the College enrollment for the Fall 2009 will be in the range of 1,550-1,650. Therefore, it is likely that the first goal of the College will be met – and most likely exceeded – one year early.

It is important that in the next year, the College reassess its goal in this area. Possible outcomes include a further increase in enrollments and/or an improvement in the quality of the student body (i.e., “bigger and better”). Several constituencies (faculty, students, alumni, industry, advisory boards) will be engaged in this discussion.

Three initiatives have been launched to achieve this goal:

1. Initiative to increase the number of applications to the College
2. Initiative to increase the number of applicants choosing to attend USC

3. Initiative to increase the retention rates in the College

It is self-evident how all these initiatives support the overall goal. In each case, several components are included in the Action Plans as indicated below. We should also point out that these strategies were developed jointly with Dr. Dennis Pruitt and his organization, as part of a comprehensive enrollment management plan. Furthermore, promotional strategies were also discussed and developed jointly with Dr. Gary Snyder and his group.

Initiative to increase the number of applicants to the College

08C: The number of accepted freshmen for the upcoming AY 08-09 has increased by approximately 14% from AY 07-08 (932 this year from a total of 818 last year). We should point out that the applicant evaluation process has not been completed yet, and a further small increase is possible. This result indicates that this initiative may have had a positive impact. Specific updates about the different plans involved are provided below.

09C: *The number of accepted freshmen for Fall 2009 has increased by approximately 19% from Fall 2008 (1,127 this year versus a total of 948 last year). This result indicates that this initiative continues to have a very strong positive impact. Specific updates about the different plans involved are provided below.*

Create and emphasize a “differentiator” (niche) for the College and its degree programs.

Our “New Face of Engineering and Computing” campaign was launched last fall and includes releasing information to the media, creating new promotional material and raising the level of awareness of our alumni and friends. It attempts to create a “niche” emphasizing the new nature and requirements of the professions and the ability of large comprehensive Universities to educate engineers and computing professionals more broadly than land grant institutions or “Tech” schools.

08C: We have continued to promote the “New Face of Engineering and Computing”. This campaign has been received very well from the different constituencies of the College (e.g., faculty, students, alumni, advisory bodies).

09C: *We have continued to use the “New Face of Engineering and Computing” slogan and promotional materials with the same positive reception from all different constituencies of the College (e.g., faculty, students, alumni, industry, advisory bodies).*

Create a distinctive image (“brand”) for the College. To this extent we have redesigned all promotional material for the different degree programs and have redesigned all our web pages with a new distinctive look.

08C: The branding effort continues with a common design for all promotional materials in the College. A specialist in web design/ communications has been hired in the College to support these activities.

09C: *We have remained consistent in our common design for all promotional and communication materials in the College. This includes “Momentum”, the College’s quarterly newsletter, which was launched in AY 07-08 and was revised in AY 08-09. Momentum has received excellent reviews from alumni and prospective students.*

Evaluate current outreach activities and select best practices. The College is already involved in a very strong outreach program, which includes First Lego (FLL) and First

Robotics Leagues (FRL) and Project Lead The Way (PLTW). In all of these activities designed to generate interest among K-12 students for science and engineering careers, the College is the State leader. This year we are evaluating the effectiveness of these programs for generating students for USC. We anticipate, that while we will maintain a public leadership role in FLL and FRL (consistent with the previous two paragraphs), we will focus most of our efforts in PLTW, which appears to be yielding the best results.

08C: An assessment of all outreach activities was conducted in AY 06-07. The results suggest that the highest impact is achieved through our participation in PLTW. The number of schools adopting PLTW courses, the number of teachers trained through our College for these courses and the number of students completing these courses and applying for College credit through USC are all increasing annually at a rapid pace. Consequently, a higher priority has been placed on this program, while emphasis on the FIRST initiatives was changed from the organization of state and local tournaments to the offering of undergraduate scholarships. The College now employs two full time professionals dedicated to outreach activities.

09C: *We have continued to support strongly PLTW activities in the State of South Carolina. This program has continued to grow at a very rapid pace. By now over 150 high schools and middle schools in the state are implementing PLTW curricula. We have also continued to pursue other opportunities and numerous outreach events are organized and hosted by the College (i.e., Girl and Boy Scouts events, Math Counts competitions, summer camps for minority students, etc.). The College is also involved in the new Consortium for Enterprise Systems Management (CESM). Some of the activities of this consortium mirror those of PLTW, but are targeting instead students interested in computer science careers.*

Initiate a new program of “creative” visits to the College for AP calculus and science HS students. All five Departments in the College have developed 2-hour moduli for HS students revolving around hands-on design experiences. These moduli were tested this Spring through a pilot program involving a visit from a HS participating in PLTW. The program will be implemented in full next Fall, with an RFP issued to all AP teachers through the State Department of Education and visits taking place on a bi-weekly schedule. The College will financially support these visits.

08C: Following the successful pilot program conducted in Spring 07, the “creative” visits program described above – Enhanced Learning Experiences (ELE) – was fully implemented in AY 07-08. We estimate that more than 750 high school students and their teachers will visit the college to participate in ELEs during the Spring 08 semester.

09C: *We have continued to support the ELE program. Actual participation in the program for AY 07-08 was on the order of 500 students, with a current estimate of 750 students for AY 08-09. We are developing a comprehensive database and will compare the names of ELE participants with incoming freshmen in an effort to assess the*

effectiveness of this program for attracting students to USC. This assessment effort will start in the Fall of 2009.

Engage HS career counselors throughout the State. In cooperation with the SC Department of Education and the USC College of Education, we will host this summer the statewide meeting of all HS career counselors. We plan to promote the College and the University through this meeting and emphasize the New Face of Engineering and Computing.

08C: In cooperation with the SC Department of Education, a regional career counselors meeting from schools participating in PLTW was held in the College in June 2007 (approximately 50 participants). A similar event has been scheduled for summer 2008, with the anticipated participation increasing to 75.

09C: *The regional career counselors meeting has become an annual event for the College and will be held again in June 2009.*

Engage and utilize alumni. We plan to create and use a network of alumni to visit local HS and make presentations on engineering and computing careers, provide information to applicants and host accepted students in their communities to lunches and dinners. In order to energize our alumni we have been hosting receptions across the state (two in the Fall in Greenville and Aiken and three planned for the Spring in Columbia, Charleston and Charlotte). We have also started a quarterly newsletter, which assists in the branding efforts as well.

08C: Our efforts to engage alumni have continued through the newsletter and regional events. Receptions were held in AY 06-07 in Columbia, Spartanburg, Aiken, Charleston, Charlotte and Houston, with participation ranging between 20 (Houston) and 200 (Columbia). During AY 07-08 similar events have taken place in Washington, DC, Columbia, Charleston and Georgetown. While we have been successful through these events in promoting the College in general, little has been done to promote specifically recruiting efforts. This plan will be reevaluated again next year and may be replaced with a more effective strategy.

09C: *We have continued to hold regional receptions for alumni and friends, primarily within the State of South Carolina, but also at other key locations. However, these events are only indirectly and remotely contributing to the goal of increasing College enrollments. Therefore, a different strategy for engaging alumni in these efforts will be considered in association with a new goal in this area.*

Reach beyond the South Carolina border. Given that 84% of the current students in COEIT are South Carolinians, the College has room to expand in the out-of-state market, while maintaining a distinctive South Carolina character. An effort was made this Fall by purchasing potential applicant lists and mailing 27,000 invitations to apply to targeted out-of-state markets. This effort will continue and intensify next year.

08C: The mass mailing to out-of-state students did not result in any significant increase in out-of-state applications. Hence, this practice was discontinued this year.

09C: *No special emphasis was placed during the last year to out-of-state recruiting. We still believe that an effort needs to be made in this direction if we are to achieve the “bigger and better” goal of the University. A new strategy needs to be developed in this area in association with the College’s next goal with respect to undergraduate education.*

Initiative to increase the number of applicants choosing to attend USC

The following Action Plans for this Initiative are common with the previous one and were therefore, listed above:

Create and emphasize a “differentiator” (niche) for the College and its degree programs.

Create a distinctive image (“brand”) for the College.

Engage HS career councilors throughout the State.

Engage and utilize alumni.

In addition, we plan to:

Move to an early decision system for engineering and computing students. Consistently applicants indicate that USC is delayed when it comes to admission decisions and first contact. This year the College plans to propose and support a change in the admissions system involving our own involvement in the decision process and resulting in early admissions for our students.

08C: We will continue to advocate an early decision system for students in our College, although we understand this is not under the College’s control. It should be noted that the efficiency and timely resolution of admission decisions was substantially improved during AY 07-08, as compared to AY 06-07.

09C: *The University-wide admissions system improved further in AY 08-09. At this point we are satisfied with the existing system and we are abandoning this plan.*

Create new visual electronic recruiting tools. An effort was made this Spring to increase the number of visual tools used to attract new students. The “USC Tube” feature was added to our CSE web page (and will be implemented next year by all Departments) and a DVD was produced and mailed to all accepted students. Circumstances beyond the boundaries of the College delayed the second project to the point that we doubt it will be effective this year, but the foundation has been set and the material is ready for use next year.

08C: A new promotional DVD was created in Spring 07 and mailed to a select group of applicants. The material was updated this year and will be used for additional outreach purposes.

09C: *The promotional DVD was used selectively this year. We have no evidence to suggest that this is an effective recruiting strategy and we plan to abandon this plan as well.*

Provide incentives for visits to USC. Several Departments by now, are paying travel expenses up to \$200 for prospective students to visit campus, since our statistics show a much greater rate of enrollment among applicants who actually visit USC. We expect that this practice will be adopted by the entire College next year.

08C: This program is still implemented only by some Departments.

09C: *We continue to support this program, with strong positive results. In addition, this year the Department of Electrical Engineering with the help of the IEEE student chapter hosted a barbecue cook-out, followed by a laboratory tour for accepted students. The enthusiasm level following this function was high and depending on the outcome (i.e., success rate in attracting participating students) similar events may be hosted next year across the College.*

Improve physical infrastructure. The condition of our facilities has been deteriorating to the point that they become a liability during parent/student visits. Funds were expended this year to change the flooring and paint the walls in certain wings of 300 Main. Flat screens utilized for News and Events announcements are added this semester to all the entrances of our two buildings. More upgrades are needed next year for Swearingen. Despite the high cost of these plans, we view such changes necessary for a successful recruiting effort.

08C: Funding has been secured and work has commenced to provide some substantial – and urgently needed – maintenance in Swearingen. We expect completion of the current phase by Summer 08. Additional work – including the creation of a gathering/studying area for all student organizations – has been identified and we are currently in the planning stages for determining costs and securing the necessary funds.

09C: *The Swearingen maintenance work was completed in Fall 2008, with strong positive reviews received from faculty, staff and students. The College is in dire need for additional upgrades of teaching (Amoco Hall) and office/lab space (Catawba building). Increased enrollments have created the need for additional and bigger classrooms, additional laboratory space and student congregation areas. We have identified potential solutions, but centralized control of classrooms and lack of funds have impeded progress in these areas. These are issues that need to be urgently addressed and lack of progress in this area could be a major threat for our undergraduate education program.*

Create a clear link between engineering and computing education at USC and employment opportunities. An agreement was reached this year for creating a Center for Career Services and Professional Development in the College. The Center will be staffed by people currently working in the University Placement Center and will focus on attracting future employers and preparing the students for interviews. The center will also organize the College's co-op and internship programs. Design and remodeling of the space needed is currently under way, with completion expected in August 2007.

08C: The College's new Career Center opened in September 2007. Completion was late by 2 months; the final cost was under the budgeted amount. The Center has a high visibility and has become a magnet for both current and visiting/prospective students and families. Center statistics for AY07-08 indicate a 75% increase in contacts with Engineering and Computing students since AY 06-07, when our students were served by the main Career Center in the School of Business.

09C: *The College's Career Center continues to exceed expectations in all relevant areas (i.e., contact hours with students, number of students registered in database, number of employers participating in job fairs, number of company events in the College, number of interviews conducted). Faculty and students are very satisfied with this plan and frequently comment on the Center and its personnel.*

Create, advertise and emphasize international opportunities. Consistent with national statistics for all College students, we have also experienced an increased interest of applicants in international programs and opportunities. Our experience has been that such programs need to be focused, well organized and above critical mass to have an impact. To this extent, following a visit to Queensland we plan to create formal exchange programs with both the University of Queensland and Queensland University of Technology targeting the teaching of one or more laboratory courses on their campuses during the summer for USC students. We will explore similar opportunities later this Spring during a trip to China and Singapore and we are in the process of establishing an exchange program with the Technical University of Troyes, France.

08C: Progress has been made for the development of focused exchanged programs in Australia and Japan, but no formal agreements have yet been signed. Promising results have been obtained from contact with Egyptian schools and the Egyptian government and a formal undergraduate research program involving Egyptian students doing undergraduate research in our College may be put in place as early as in Summer 08. A new Associate Dean for International Programs (Dr. Chaudhry) was appointed in Fall 07.

09C: *Associate Dean Chaudhry has undertaken a number of projects/initiatives with Taiwan, Egypt and Jordan. Most of these initiatives at the undergraduate level target international students and focus on summer research experiences that we can provide here at USC, or joint 3+2 BS/MS programs. These projects have already started to*

produce a small revenue stream and have the potential of attracting high quality doctoral students in the future. In contrast, progress regarding the participation of outbound USC students has been relatively slow. New programs will have to be developed in this area and an international component may become part of the College's next target for our undergraduate education program.

Increase available scholarship funds. Strong financial incentives remain a major factor in the student decision process. We have made raising scholarship funds the number one priority for the upcoming development campaign and have been taking every opportunity to bring this need in front of potential donors during our discussions with them. We are also considering redirecting some existing funds in the College's limited endowment towards scholarships and will continue to do so in the future.

08C: A very strong effort was made this year to increase available scholarship funds. This effort – supported by the College's Executive Council – resulted in a major announcement in February 2008, introducing the ECELS (Engineering and Computing Extended Life Scholarships) program. More than \$300,000 was raised for this program and we expect the efforts to continue on an annual basis. ECELS is an innovative concept providing bridging funds to a number of qualified students between the amount of the state LIFE scholarships and the cost of tuition and fees, in essence rendering the cost of education for these students “free”. The impact of the ECELS on the yield of accepted students will be assessed and reported next year.

09C: *50 ECELS scholars are supported by the College in AY 08-09. We expect a similar number of new ECELS scholars to be supported in AY 09-10, thus, fulfilling our public promise during the February 2008 announcement of the ECELS program of “100 new scholars” through this program. Although current fundraising conditions have been strongly affected by the economic downturn, the College is committed to the ECELS program and expects to continue beyond AY09-10. However, the number of scholars will depend on our ability to continue raising the necessary funds. The ECELS program also became the catalyst for a reorganization of the College's scholarship strategy and procedures with very beneficial results.*

Advertise and simplify transfer process from other USC campuses and in-state institutions. This Fall we have also analyzed the data regarding transfer students and decided to focus our recruiting efforts for transfer students on all USC campuses, Midlands Tech and the College of Charleston. Agreements are already in place with these schools, although we plan to revisit the agreements with USC Aiken, Upstate and Beaufort and propose new dual degree programs that appear to fit local needs better. By the end of April, we will have completed a program of visits of the COEIT Dean to all these institutions. We have also initiated a process, in which a “local champion” is designated in each institution and offered an adjunct appointment in our College and a small financial incentive in the form of travel funds. We are also preparing promotional materials and organizing a conference in Columbia for representatives from all these

institutions, with the goal of identifying common problems and bottlenecks in the transition process from their campuses to USC.

08C: All regional campuses were visited by Dean Amiridis in AY 07-08. “Local champions” were identified in each campus, appointed as adjunct faculty of the College, and visited Columbia at least once in the last few months. Repeat visits and meetings with students were also arranged by Associate Dean Perkins. In AY 08-09 we anticipate the signing of at least one 3+2 agreement (with USC Aiken). We have also signed a similar agreement with Elon University (NC) and we are negotiating additional agreements with Presbyterian College and Coastal Carolina. The number of new transfer students in AY 07-08 was at a historic high, increasing by 24% from AY 06-07 (97 vs. 78).

09C: USC Aiken saw no particular gain from a 3+2 agreement and therefore, this plan was abandoned. In contrast, a similar agreement was signed with Presbyterian College, while no progress was made with Coastal Carolina. A transfer agreement was signed in Fall 2008 with Piedmont Tech in the areas of Electrical and Mechanical Engineering. Overall, transfer rates continue to be at or near historic highs indicating that the bridge building program undertaken in AYs 06-07 and 07-08 have been very successful.

Initiative to increase the retention rates in the College

09C: We have started tracking and documenting in detail retention rates for the College using our own data and a very strict definition of retention (i.e., students not making progress in their degree requirements by registering for appropriate classes are not considered “retained” even though they may have not formally changed their major). Data for Freshman-Sophomore retention rates for the last five academic years are shown in Table 09C-1.

Table 09C-1: CEC Freshman-Sophomore Retention Rates

Class entering in:	Fall 2003	Fall 2004	Fall 2005	Fall 2006	Fall 2007
Returning	44%	48%	48%	57%	60%
Transfer/Withdrew	33%	27%	31%	22%	22%
Ineligible	24%	24%	22%	20%	17%

The data indicate a strong improvement in retention rates in the last two years, suggesting that this initiative is producing results. It is also important to note that the increased retention rates can be attributed to both an improvement of the academic performance of the freshman class (i.e., lower percentage of ineligible students), as well as a stronger interest to remain in the College (i.e., lower percentage of students transferring out of the College).

The following Action Plans for this Initiative are common with the previous one and were therefore, listed above:

Improve physical infrastructure.

Create a clear link between engineering and computing education at USC and employment opportunities.

In addition, we plan to:

Improve quality of teaching in first year courses. Most students decide to drop out from engineering and computing disciplines in their first year; frequently after they have taken no courses in their originally intended major or just one introductory course. Retention rates are expected to improve if the students' experience in this single course improves. Hence, our plan for next Fall is to assign some of the best instructors to the entry level courses.

08C: An effort was made to assign more experienced instructors to freshmen courses with mixed results. Further evaluation and assessment are needed in this area.

09C: *We have continued to assign freshman level classes to the best instructors.*

Utilize existing mechanisms to recommend supplementary instruction for Math and Science courses. Significant progress has been made in the College of Art and Science with supplemental instruction for students at risk in math and science courses. The available mechanisms were and will continue to be communicated to engineering and computing student advisors, in an effort to assure that our students are aware of and take advantage of these opportunities. A similar supplemental instruction initiative is also considered for lower level engineering and computing courses.

08C: The use of central University resources for supplement instruction is for the first time tried this year on an experimental basis for a low level Electrical Engineering course.

09C: *We were satisfied with the results obtained in AY 07-08 and during AY 08-09 we expanded the supplement instruction approach to the lower level computing classes.*

Introduce Professional Development course for freshmen. A proposal for a new College-wide freshmen-level Professional Development course is currently pending at the Faculty Senate. Provided that it will be approved, this course will be taught for the first time next Fall. The objective of this course is to introduce incoming freshmen to the engineering and computing professions and it is expected that by providing a long-term career perspective it will assist our retention efforts.

08C: Two such new courses were successfully introduced in Fall 07 for Engineering and Computing students. Student and instructor responses and course evaluations were strongly positive and this effort will continue.

09C: *Retention rates for the students enrolled in these two courses in Fall 2007 were in excess of 70%, compared to the 60% average for the College. Hence, we believe that these two courses may contribute to the retention of freshmen students and we are committed to teaching them on an annual basis.*

Establish excellent rapport with student groups. Student groups can and should become the spearhead in our retention rates. It is therefore, critical for – among others – retention purposes as well, to establish an excellent rapport between the College and these groups. Starting last Fall, the Dean is meeting with the leadership of these groups on a monthly basis and discusses all issues related to their operation, as well as any additional student issues brought up. These meetings have been proven very valuable so far, and we plan to continue them next year.

08C: Meetings of the Dean with the student leadership in the College have been taking place on a regular basis. Furthermore, some token financial support has been provided by the College for student organizations. The College is also involved in the Engineering dorm community.

09C: *We continue to meet with the student leadership on a regular basis, to provide some minimal financial support for student group activities and to be engaged in the Engineering dorm community..*

New 08 plan: A new degree program is proposed this year in Engineering Science. This degree will allow students to get a more broader view of engineering and also pursue other interests and potentially professional degrees (e.g., Business, Law, Education). A preliminary application has been submitted this Spring to CHE, and the new program is going through the internal approval process.

09C: *We have followed up through the internal and external (i.e., CHE) steps of the process for establishing this new degree program. Final approval of the program by CHE is expected in April 2009, and the first students will be enrolled in the program in Fall 2009.*

Goal 2: Receive a US News & World Report top 10 graduate ranking among Engineering and Computing Colleges in the Southeast by 2012 and a top 5 ranking by 2017.

This goal is intimately related to elements of both the College's mission (i.e., continuously improve our graduate program; conduct world-class research) and vision (i.e., become a worldwide recognized Center of Research Excellence in at least three important areas). This goal is also related to the financial viability of the College under

the University's current fiscal model, due to the importance of the IDC costs returned to the College.

Since this goal is related to rankings performed by an external entity, it is very important to understand the factors affecting these rankings. A brief examination reveals that in addition to reputation among peers, some quantitative metrics including the size of the graduate and research programs (i.e., total number of PhD students and research expenditures), the quality of students and faculty (i.e., number of NAE members for faculty and GRE scores for students) and the productivity of the faculty (PhD production and research expenditures per faculty) are also taken under account.

08C: Several indicators associated with graduate studies and research show strong positive trends in AYs 06-07 (FY07) and 07-08 (FY08), as indicated in Table 08C-2 below.

Table 08C-2: CEC Research Productivity Indicators

	AY 04-05 FY05	AY 05-06 FY06	AY 06-07 FY07	AY 07-08 FY08	AY 08-09 FY09
Faculty count (8/16)	95	96	89	93	86
PhD degrees	29	38	46	40	19 ¹
Expenditures (\$M)	20.0	16.8	18.2	19.7	
Awards (\$M)	25.3	19.9	16.7	22.3	8.8 ²
Comp. awards (\$M)	12.1	12.9	15.2	16.5	7.9 ²

¹ August and December 08 graduations

² Up to 12/31/08

More specifically, the number of PhD degrees awarded reached a historic high of 46 in AY 06-07, corresponding to a 60% increase over the last two academic years. The normalized annual PhD production rate of 0.52 PhDs/faculty for AY 06-07, places the College in an elite group nationwide. Despite the fact that a similar number may be reached (or even exceeded) in AY 07-08, current graduate enrollment data show that these rates are not sustainable, at least for the foreseeable future. Yet, a temporary plateau at an annual rate of 0.35-0.40 PhDs/faculty member (i.e., a total of 35-40 PhD degrees awarded annually) will represent a substantial increase over the College's historic rates (20-30 PhD degrees awarded annually) and will be sufficient to satisfy the College's intermediate goal (i.e., top 10 Southeast ranking by 2012).

Research expenditures increased by 8% in FY 07. A smaller, yet sizeable (i.e., 2-3%) increase is also expected for FY 08. The normalized annual research expenditures of \$210,000 per faculty are consistent with the College's intermediate target. Furthermore, new award data show a historic high in competitive awards in FY 07 (18% increase over FY 06; competitive awards remained almost constant for FYs 03-06). This record will be easily broken in FY 08 (current pace indicates a possible 25-30% increase!). Hence, the new award data indicate a strong trend towards competitive awards (as opposed to

earmarks) and the creation of a more sustainable research funding model for the College.

09C: *Table 08C-2 was revised to include final results for FY 08 and preliminary results for FY 09 for several key research indicators. These results indicating continuing strong positive trends in several key categories. For example, the number of PhD degrees awarded remained above 40 in AY 07-08 (normalized annual PhD production rate of 0.43 PhDs/faculty), once again placing the College in an elite group nationwide. As we pointed out last year this rate is not sustainable, at least for the foreseeable future and a temporary plateau at an annual rate of 0.35-0.40 PhDs/faculty should be expected. Research expenditures once again increased by 8% in FY 08, while competitive awards reached another historic high in FY 08 and recorded an 8.5% increase over the previous high in FY 07. Finally, new awards increased by 33% in FY 08. Mid-year results for FY 09 indicate no further increases in all categories, although the trends could be easily reversed with a couple of sizable awards in the second part of the year.*

Despite all these positive developments, it became apparent to us that this goal is unattainable in the time frame originally specified. A comparative analysis of the other Colleges in the Southeast who are currently ranked in the top 10 indicated that a minimal size of 120-140 TTF members is required to be able to reach the overall (and not per faculty member) research productivity indicators required for such a ranking. Although the College has never been at a size over 100 TTF, such a growth was possible and desirable, especially given the increase of the undergraduate student associated with goal 1. However, during the last eight months the College has lost \$1.5M in recurring funds from its state support, with an additional budget cut possible in July 2009. These funds are equivalent to 15 junior faculty positions that could have propelled the College headcount above 110 and within reach of the size needed for a top 10 ranking in the Southeast. Without these positions and with no reasonable expectation to replace them anytime in the near future, it becomes highly improbable that we will reach this goal by 2012.

These thoughts and conclusions were communicated to the faculty in January 2009 and a process has been initiated to identify and accept an alternative goal consistent with the research aspirations of the College within this semester.

Nevertheless, progress of the different initiatives is reported below, both for archival purposes, as well as for the establishment of baselines for future use in strategic planning exercises.

We are therefore, launching three initiatives to improve the College in these areas:

1. Initiative to increase the size and continue to improve the quality of the faculty
2. Initiative to improve the quality and continue to increase the quantity of the research conducted in the College
3. Initiative to increase the number and improve the quality of PhD students

It is self-evident how all these initiatives support the overall goal. In each case, several components are included in the Action Plans as indicated below.

Initiative to increase the size and continue to improve the quality of the faculty

Increase the College's endowment for chairs and Professorships. After undergraduate scholarships this is the College's number two priority for the upcoming development campaign. A larger endowment will not only allow us to attract some senior faculty to USC, but most importantly, to retain the top performers. We have been taking every opportunity to bring this need in front of potential donors during our discussions with them and will continue to do so in the future.

08C: A substantial endowment (\$5M) was created in association with the CoEE in Clean Coal. Efforts to match previous CoEE's have not yet been successful. A review of the College's limited endowment funds indicated that some of these funds were underutilized and 4 new low level Professorships will be offered to faculty members through a competitive process in Spring 08.

09C: *One additional CoEE (Solid Oxide Fuel Cells) was matched last year with the assistance of the University's upper administration. Furthermore, the 4 new professorships were offered through a competitive process last spring, the potential awardees were identified and are currently going through the University process for final approval.*

Hire at least three members of the National Academy of Engineering (NAE) by 2012. The existing, as well as future, Centers of Economic Excellence should and will be the vehicle for these hires. The first such hire was completed successfully this year with Professor Reifsnider in Mechanical Engineering. If this Plan is executed successfully, it will place the College among the top three in the Southeast in this category.

08C: No progress to report.

09C: *No progress to report.*

Utilize the FEI plan and external "infrastructure-building" proposals to hire junior faculty. The College will increase its participation in the FEI initiative in the future. This will allow us to hire junior faculty members strategically, in targeted research areas. External proposals (such as the NSF-EPSCoR RII or the NIH-INBRE programs) and federal earmarks will be used to secure part of the start-up funds required for these new hires, with the balance provided by the IDC returns from the College and the Office of Research.

08C: A total of 11 new Assistant Professors with outstanding academic pedigrees were hired in AY 07-08. Among them were 8 FEI hires. The College was also heavily involved

in the FEI competitions for both AY 06-07 and 07-08, and is an active participant in several clusters awarded. A total of 8-9 new Assistant Professor hires are anticipated for AY 08-09, with 4-6 of them expected to be through the FEI program.

09C: *A total of 6 new Assistant Professors with outstanding academic pedigrees were hired in AY 08-09. Among them were 2 FEI hires. A total of 6-7 new Assistant and Associate Professor hires are anticipated for AY 08-09, with 4-6 of them expected to be through the FEI program.*

Improve and standardize junior faculty start-up packages across the College. It is critical that highly competitive start-up packages are advertised and provided to safeguard the quality of the junior faculty members attracted to the College and insure their future success. This year, we are improving and standardizing all start-up packages across departmental lines. We are also requiring that all start-up funds be utilized within a 3-year period.

08C: All new start-up packages in the College have been standardized in the last year in terms of teaching loads and funds provided for student support. Furthermore, a strong effort was made to meet all reasonable equipment needs. As a result, record high start-up packages were provided to new hires in Civil, Computer and Mechanical Engineering. This could not be possible without the support of the Offices of the Provost and Research. These strong, nationally-competitive packages allowed us to compete nationally and hire individuals with outstanding credentials. We are confident that their impact in terms of educational and research activities will be highly visible in the near future.

09C: *We have continued to provide nationally competitive salaries and start-up packages to all new hires and to standardize them across Departmental lines. However, we have not received yet any assurances for partial support of the start-up packages from the University, although we have committed several million start-up dollars to these new hires. By now, we have exhausted the College's resources and lack of support from the University will create a threat to the financial stability of the College.*

Improve the mentoring of junior faculty members. We have formed the Untenured Faculty Group (UFG) in the College, which formally meets on a monthly basis. Guest speakers to these meetings have included senior USC administrators discussing tenure and promotion issues and program managers from different funding agencies discussing procedures and opportunities. A trip has also been planned for DC in early May to introduce many of our junior faculty members to program managers in different federal funding agencies. A "Teaching Buddies" program will also be initiated next Fall for all new junior hires in the College. This program will pair new hires with experienced teachers in a first semester co-teaching assignment, creating an apprenticeship environment designed to improve the teaching performance of the new hires.

08C: The UFG program is viewed very positively by the junior faculty and continued in AY 07-08. Three trips were organized to Washington DC since May 2007, targeting junior faculty members with NSF and NIH interests. These trips were well attended (more than 15 faculty participated in total) and received strong positive reviews by the participating faculty. This program will also continue in coming years. Finally, the “Teaching Buddies” idea was not implemented in AY 07-08. The program is reconsidered on a pilot basis for AY 08-09.

09C: *We have continued these programs in AY 08-09 and doubled the number of trips to funding agencies in Washington, DC. The “Teaching Buddies” idea was abandoned due to lack of interest at the Departmental level.*

Strengthen existing T&P criteria. We have formed a senior level committee, which has been charged with the review of all T&P criteria in the College. Depending on their comments, some units may be asked to consider revising their criteria with emphasis placed on strengthening the research component.

08C: The committee has not made significant progress and we have experienced some resistance to changes in the units’ T&P criteria.

09C: *This plan was abandoned due to lack of support from the faculty.*

Initiative to improve the quality and continue to increase the quantity of the research conducted in the College

It is self-evident that the quantity and quality of the research conducted in the College is directly related to the size and quality of the faculty. As a result, all Action Plans discussed above in support of the Initiative to increase the size and to continue to improve the quality of the faculty also apply in this case. Additional Action Plans uniquely associated with this Initiative are discussed below.

Conduct external reviews and SWOT analyses of all graduate and research programs in the College. We have initiated an external review process of all graduate and research programs in the College, expected to be completed by the end of Summer 2007. The teams conducting these reviews were selected by the Dean and include several members of the National Academy of Engineering, Deans and Chairs from top academic institutions across the country. They were charged with the objective of conducting a fair yet critical review, evaluating current quality and productivity, commenting on Departmental growth plans and identifying missed opportunities. Our goal is to utilize these reviews in the formulation of a comprehensive strategic research plan for the College. We should point out that since these external reviews are ongoing at this point, some of the elements of a strategic plan presented as Action Plans in this Blueprint document, may be revised in the near future.

08C: External reviews were conducted in AY 06-07 for three of the five academic Departments. The visiting teams' reports have been communicated back to the Department Chairs and have been utilized in the strategic planning of the individual Departments. The remaining two Departments will be reviewed in AY 08-09. The delay was introduced because of change of leadership issues in these two units (i.e., Mechanical and Computer Science and Engineering).

09C: *This plan was completed in FY 07-08.*

Focus new hires and resources on selected research areas. We plan to focus our efforts strategically in three key research areas, which already show promise in the College and are aligned with the priorities of the University. These include:

Energy Research with emphasis on fuel cells and hydrogen, carbon utilization, photovoltaics, power electronics, and nuclear engineering;

Advanced Materials Research with emphasis on nano-electronics and nano-photonics, catalysts and adsorbents, micro- and nano-mechanics, structural dynamics and health monitoring of structures, nano-composites, tissue engineering and biomechanics; and

Computational Research with emphasis on bioinformatics, molecular level simulations, databases and security, networks and antennas, and automation and robotics.

08C: Out of a total of 12 new tenure track faculty hires in AY 07-08, 11 have been focused in the research areas outlined above. Similar results are expected for the group of new hires for AY08-09.

09C: *Out of a total of 6 new tenure track faculty hires in AY 08-09, 5 have been focused in the research areas outlined above. Similar results are expected for the group of new hires for AY09-10.*

Increase NIH funding for the College. Given the difference in the size of the typical awards between NIH and NSF or DOE and the limited success that the College has traditionally had with NIH, even a modest increase in the number of NIH grants can have a substantial impact in total research expenditures. Such a direction is also consistent with the creation of the new Biomedical Engineering program. Our Action Plan in this area calls for hiring of faculty members with expertise in biomedical engineering fields, visits to NIH and hosting of annual workshops for our current faculty and new hires. We also plan to take advantage of the SC Bioengineering Alliance and use the expertise of its new director, Dr. Swaja, who also holds an adjunct appointment in our College.

08C: A total of 5 new tenure track faculty members were added to the College in AY 07-08 with research interests in NIH-related areas. We will continue this trend for AY 08-09. Prof. Homay Valafar (CSE) received his first NIH grant in Spring 2007.

09C: *No new hires were made in this area in the College in AY 08-09. However, approval of the pending NSF-RII proposal is expected to provide new incentives and funding for biomedical engineering hires in AY 09-10 and beyond.*

Obtain at least one major NSF Center and one IGERT by 2012. The two strongest research areas within the College (i.e., fuel cells and nano-electronics/nano-photonics) are competitive for major NSF Center type of Awards (e.g., ERC, STC, MRSEC or NSEC). The group of investigators involved in this type of research should also be able to compete for an NSF-IGERT award. Our Plan is to pursue such awards in every available call. The Dean's office will provide support and incentives and has communicated the expectations for such awards to the senior researchers in these areas.

08C: Two strong efforts were made along these lines in FY 08. An IGERT proposal – energy-related materials – submitted by Dr. Popov (ChE) and involving faculty from several Departments across the College and the University was selected for full development, but did not receive an award. The proposal will be improved and resubmitted in FY 09. Researchers from three different Departments (CEE, ChE and ME) under the leadership of Dr. Ziehl were also involved in an ERC proposal – sustainable construction in coastal regions – which reached the site visit stage and is currently pending (Lead: University of Miami).

09C: *Obtaining funding for a major Center remains a challenge for the College. Lack of senior technical leadership is in the opinion of the Dean the main reason. We expect the situation to improve as we hire more CoEE endowed chairs in the near future.*

Create and maintain multi-user research facilities. The lack of any user research facilities within the College is considered a significant weakness for this Initiative. While this situation can not be rectified immediately, our plan is to utilize federal earmark funds and IDC returns to build such infrastructure in different key areas. We have used for example, earmark funds to buy a \$600K XPS instrument for materials characterization, which can be used by a number of investigators from the Departments of Chemical, Electrical and Mechanical Engineering. Our plan is to staff this facility and operate it as a cost Center starting in Summer 07. We have also used earmark funds and IDC returns to buy two computer clusters, which can be used by investigators conducting computational research in all five Departments in the College. Our plan is to buy an additional cluster and staff this computational facility, the scope of which will be expanded to serve the entire campus.

08C: The XPS user facility became operational according to schedule in Summer 2007. Plans to expand and staff the computational facilities have been delayed due to parallel efforts conducted outside the College (and beyond our control). An MRI proposal was submitted by faculty in several Departments in the College, under the leadership of Dr. Sudarshan, for a new state-of-the-art SEM system. If the proposal is selected for

funding, a new user facility will be created around this instrument as well. The College will continue to pursue major instrumentation opportunities aggressively.

09C: *A computational user facility was reorganized and staffed by the College in summer 2008. The College has also committed \$600,000 for the creation of an environmental engineering user facility. These funds were committed as part of the start-up packages for a new cluster of three junior faculty members in this area.*

Initiative to increase the number and improve the quality of PhD students

The total number of graduate students in the College is closely related to the total research expenditures. As a result, all Action Plans described above regarding the increase quantity of research are also expected to have a direct effect on this Initiative as well. In addition, the following Action Plans are specifically targeted towards the number and quality of PhD students.

Continue to emphasize the importance of PhD students. Several administrative measures taken by the University in recent years (i.e., graduate tuition, unit funding model) have had an impact on the cost of graduate students and from a financial point of view, have made the use of postdoctoral associates much more attractive to individual investigators. Going against this trend, we plan to continue to emphasize and promote doctoral education, since the numbers of PhD students and graduates directly impact national rankings. Along these lines, we plan to provide incentives (in terms of tuition supplements) only for doctoral students and reward faculty productivity in this area.

08C: A new financial incentive program – Doctoral Education Fund (DEF) – in support of doctoral education was announced and implemented in Fall 2007. The program rewards the graduation of doctoral students (\$5,000 per graduate) and provides matching funds to faculty IDC returns. Monies accumulated in the DEF fund by individual faculty members can be used exclusively for the support of new doctoral students.

09C: *Despite the current financial difficulties, the College has continued to support the Doctoral Education Fund described above and is committed to doing so in AY 09-10 as well.*

Create an international recruiting network for PhD students. In an attempt to improve the quality of the doctoral students we are planning the creation of an international network of feeder schools. We are in the final stages of signing an agreement with the Egyptian government, designating USC as a target school for Egyptian Graduate Fellowship recipients. We are also pursuing such an agreement with Lybia and Saudi Arabia. Finally, we have formed a faculty committee planning a recruiting strategy in countries of the former Soviet block. We plan to assess these activities on an annual basis, continue successful programs and modify others, respectively.

08C: The agreement with the Egyptian government was signed in Summer 2007, and as a result, three fully funded doctoral students are arriving to the College to commence their studies in August 2008. The College also financed a trip by the Graduate School to Libya to initiate an effort in this direction. Prof. Chaudhry was appointed Associate Dean for International Programs in Fall 2007 and has assumed the primary responsibility for these programs, as well as for new initiatives.

09C: *The College has continued to pursue international opportunities for doctoral students. A new program – similar to the one described above for Egyptian scholars – is currently under negotiation with Jordan.*

Finally, we should point out that while no specific goal has been set for **economic development activities**, we fully expect that such activities will be supported and enhanced by the improved research environment described above. We plan to monitor progress in this area and provide incentives to faculty and students involved.

II. Planning and Funding Model

A. Budget System Used Now

Funding for the College currently derives from the following categories

- Student tuition and fees
- State allocation
- Special University initiatives allocations (i.e., CP and FEI plans)
- Self-generated funds
- IDC returns from grants and contracts

The expenses of the College can be divided in

- Faculty and staff salaries and fringe benefits (primary component)
- Graduate teaching/instructional/staff assistant stipends and tuition supplements (minor component)
- Departmental operating costs (minor component)

These expenses represent the ongoing cost of running the College as an educational unit, primarily for the undergraduate level. Added to these expenses are the costs of the research programs, which include postdoctoral fellows' and graduate research assistants' stipends and tuition, new faculty startup costs, and equipment purchase and maintenance costs.

Currently, 45% of the IDC returned to the College is returned to the unit generating it for use as startup and matching funds, for departmental initiatives, for research incentives, etc. The remaining 55% is retained at the College level and is used as the College's contribution to startup and matching funds. In the

future we also plan to use part of these funds to support user research facilities at the College level.

B. Plans for Enhancing Revenue

Of the funding sources listed above, the college has significant influence on tuition and has some control over self-generated funds and IDC.

- Increased **tuition revenue** has materialized in the last two years as a result of our first goal focusing on increasing the number of undergraduate students in the College. We also continue to envision a situation in which the College will offer successful courses for students not majoring in engineering or computing, thus generating additional tuition revenue.
- An increase in **self-generated funds** can result from increased offerings of continuing education courses to the engineering and computing communities outside the university. The Department of Civil and Environmental Engineering, for example, runs short courses for engineers as a revenue-enhancement activity. Income from these activities is currently very small.
- The most significant source of revenue other than tuition comes from **grants and contracts** and from the concomitant returned IDCs. With increased faculty activity – as described in Goal 2 above – an increase in IDC returns is also anticipated. On the other hand, new rules for IDC distribution from earmarks, the already substantial success in some departments in competitive funding, and the necessity to replace in some cases federal earmark funds with competitive ones indicate that significant increases in IDC returns may be difficult to realize in the next 2-3 years.
- The final source of funds are **development funds**, which are currently pursued vigorously from both alumni and large corporations.

III. Unit Statistical Profile

A. Instructional: (Items 1-9 will be provided to each unit by the Assessment & Compliance Office at ipr.sc.edu.)

1. Number of applications for Fall 2005, Fall 2006, Fall 2007, and Fall 2008 admission by level (certificate, first professional, masters, doctoral).

Applications	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Undergraduate	1,431	1,369	1,622	1,755
Masters	323	353	270	287
Certificate	2	5	3	1
First Prof.	0	0	0	0
Doctoral	223	188	263	306

2. Number of admissions for Fall 2005, Fall 2006, Fall 2007, and Fall 2008 by level (certificate, first professional, masters, doctoral).

Admissions	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Undergraduate	937	871	947	1,128
Masters	142	136	103	106
Certificate	2	3	2	0
First Prof.	0	0	0	0
Doctoral	122	88	107	137

3. Freshmen retention rate for classes entering Fall 2004, Fall 2005, Fall 2006, and Fall 2007

Freshman retention rate for classes entering

Fall 2004__79.9%

Fall 2005__82.1%

Fall 2006____86.4%

Fall 2007_____84.6%

4. **Number of majors enrolled in Fall 2005, Fall 2006, Fall 2007, and Fall 2008 by level (headcount and FTE; undergraduate, certificate, first professional, masters, doctoral).**

By Headcount

Majors	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Undergraduate	1,299	1,255	1,345	1,454
Masters	182	190	210	120
Certificate	0	2	1	1
First Prof.	0	0	0	0
Doctoral	263	233	219	216

By FTE

Majors	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Undergraduate	795	778	806	877
Masters	96	96	103	85
First Prof.	0	0	0	0
Doctoral	177	150	139	148

5. **Number of graduates in Fall 2007, Spring 2008, and Summer 2008 by level (undergraduate, certificate, first professional, masters, doctoral).**

Degrees Awarded	Fall 2007	Spring 2008	Summer 2008
Undergraduate	72	128	5
Masters	40	18	17
Certificate	1	1	0
First Prof.	0	0	0
Doctoral	18	12	7

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

Class	Four Year	Five Year	Six Year
2000	16.0 \ 10.6 \ 26.6	34.1 \ 21.2 \ 55.3	36.5 \ 24.9 \ 61.4
2001	17.0 \ 10.1 \ 27.1	29.1 \ 21.0 \ 50.2	32.0 \ 24.2 \ 56.2
2002	20.7 \ 12.7 \ 34.4	33.4 \ 24.9 \ 58.3	35.2 \ 27.7 \ 63.0

Same school\Different school\ Total

7. **Total credit hours generated by your unit (regardless of major) for Fall 2007, Spring 2008 and Summer 2008.**

Student Credit Hrs	Fall 2007	Spring 2008	Summer 2008
Undergraduate	12,087	11,442	374
Masters	1,237	1,037	163
First Prof.	0	0	0
Doctoral	1,251	1,212	177
Total	14,575	13,691	714

8. **Number of faculty by title (tenure-track by rank, research by rank, etc.), as of Fall 2005, Fall 2006, Fall 2007, and Fall 2008 (by department where applicable).**

TTF	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Professor	31	28	30	30
Assoc. Prof	33	31	31	31
Asst. Prof.	32	30	32	25
Total	96	89	93	86

Research Fac	Fall 2005	Fall 2006	Fall 2007	Fall 2008
Professor	2	2	6	4
Assoc. Prof	1	1	3	2
Asst. Prof.	7	8	11	8
Total	10	11	20	14

Instructors	2	2	2	2
-------------	----------	----------	----------	----------

Adjunct Faculty	10	13	13	17
-----------------	-----------	-----------	-----------	-----------

9. **Total continuing education units (standard University CEUs or Institutional CEUs) generated for Fall 2007, Spring 2008 and Summer 2008. (Please refer to policy RACM 1.04.)**

None, not applicable to the College of Engineering and Computing

B. Research and Creative Accomplishments:

Each of the following should be by department where applicable:

10. Numbers of publications in calendar year 2008 by category (e.g., books, book chapters, refereed articles, non-refereed publications).

Category	CHE	CEE	EE	ME	CSE
Books	2	1	0	2	3
Book chapters	2	0	2	9	7
Refereed journal articles	57	30	29	55	46
Refereed conference proceedings	11	25	38	12	41
Non-refereed publications	11	3	7	28	10

11. Number of research paper presentations at national or international conferences in calendar year 2008.

	CHE	CEE	EE	ME	CSE
Research paper presentations	62	19	30	54	41

12. Number of performances and/or juried exhibitions at national or international venues in calendar year 2008.

None

13. **Summary of sponsored research activity to include grant applications submitted and awarded, arranged by sponsoring agency in FY 2008 and to date in FY 2009.** (does not include internal awards)

Chemical Engineering

Sponsoring Agency	PI Name	Amt First Yr
ALSTOM Power Inc.	Dr. Christopher T Williams	\$43,117
BP Oil International Limited	Dr. Christopher T Williams	\$39,956
CellTech/US Army Research Office (ARO)	Dr. Ralph Edward White	\$40,000
College of Charleston/NASA	Dr. Branko Popov	\$250,000
Fraunhofer Institutes	Dr. John W Van Zee	\$100,000
Gecko Energy Technologies, LLC	Jean St-Pierre	\$67,212
Giner Electrochemical Systems, LLC	Dr. John Weidner	\$8,000
INI Power Systems, Inc.	Dr. John W Van Zee	\$5,000
Intelligent Energy, Inc./DOE	Dr. James Anthony Ritter	\$75,000
Millennium Cell/DOE	Dr. John Weidner	\$50,000
Montana Polysaccharides Corp./DARPA	Dr. Harry J Ploehn	\$40,000
National Aeronautics & Space Administration(NASA)	Dr. James Anthony Ritter	\$150,000
National Renewable Energy Laboratory (NREL)/DOE	Jean St-Pierre	\$10,064
National Renewable Energy Laboratory (NREL)/DOE	Jean St-Pierre	\$9,397
National Science Foundation (NSF)	Dr. Christopher T Williams	\$38,800
National Science Foundation (NSF)	Dr. Christopher T Williams	\$8,000
National Science Foundation (NSF)	Dr. Michael A. Matthews	\$117,096
National Science Foundation (NSF)	Dr. Esmail Jabbari	\$104,900
National Science Foundation (NSF)	Dr. Christopher T Williams	\$100,731
NSF	Dr. John W Van Zee	\$47,764
Office of Naval Research (ONR)/DOD	Dr. Ralph Edward White	\$100,000
Oral and Maxillofacial Surgery Foundation	Dr. Esmail Jabbari	\$75,000
Palmetto Fuel Cell Technologies, LLC	Dr. John Weidner	\$15,477
Palmetto Fuel Cell Technologies	Dr. Woo-kum Lee	\$12,400
Pegasus Biologics Inc	Dr. Michael A. Matthews	\$3,720
Petroleum Research Fund/Amer. Chemical Society	Dr. Edward P Gatzke	\$45,000
Quallion/Army Space and Missile Defense Command/DOD	Dr. Ralph Edward White	\$30,000
SC Research Authority (SCRA)/SC EPSCoR	Dr. Michael Amiridis	\$65,078
SC Space Grant Consortium/NASA	Dr. James Anthony Ritter	\$30,000
SC Space Grant Consortium/ NASA	Dr. John Weidner	\$20,000
SmartKoncept Inc/DOE	Dr. James Anthony Ritter	\$133,733
South Carolina EPSCoR/IDEA Program	Dr. Michael A. Matthews	\$20,000
Studsvik, Inc.	Dr. James Anthony Ritter	\$65,000
University of Texas at Austin	Dr. James Anthony Ritter	
UOP LLC A Honeywell Company	Dr. Christopher T Williams	\$81,794
UOP, LLC - A Honeywell Company	Dr. John R. Monnier	\$199,789

III. B. 13. continued Sponsored Research Awards FY08 thru 12/31/2008 by sponsor

Civil and Environmental Engineering

Sponsoring Agency	PI Name	Amt First Yr
Advanced Technology Institute	Dr. Dimitris C Rizos	\$119,989
Advanced Technology Institute/ARO	Dr. Dimitris C Rizos	\$135,519
Duke University/EPA	Jonathan Goodall	\$10,819
Duke University/NIH	Jonathan Goodall	\$3,208
National Science Foundation (NSF)	Dr. Dimitris C Rizos	\$133,712
NC State University-ITRE/NC Dept. of Transportation	Dr. Nathan Huynh,	\$10,244
North Carolina State University/NC State Office of Budget and Management	Mecit Cetin	\$40,000
Richland County	Jonathan Goodall	\$24,048
Richland County	Dr. Joseph RV Flora	\$19,800
Richland County	Liv M Haselbach	\$20,000
SC Department of Transportation (SCDOT)	Dr. Juan Caicedo	\$74,890
SC Department of Transportation (SCDOT)/FHWA/USDOT	Dr. Paul Ziehl	\$150,891
SC Department of Transportation/FHA	Dr. Charles Pierce	\$112,479
SC Department of Transportation/FHWA	Ronald Baus, PhD	\$111,235
SC Space Grant Consortium/NASA	Dr. Charles Pierce	\$8,000
Sun Pile Driving LLC	Dr. Paul Ziehl	\$12,500
Sun Pile Driving LLC	Dr. Paul Ziehl	\$28,000
Sun Piledriving Equipment, LLC	Dr. Paul Ziehl	\$60,224
UNC - Chapel Hill/ MicroSoft Corporation	Jonathan Goodall	\$34,988
US Corps of Engineers ERDC Contracting Office/DOD	Dr. Dimitris C Rizos	\$51,284
WSA/Lower Savannah Council of Governments (LSCOG)	Mecit Cetin	\$26,904

Computer Science and Engineering

Sponsoring Agency	PI Name	Amt First Yr
Palmetto Health	Dr. Michael N Huhns	\$22,867
National Science Foundation (NSF)	Dr. Chin-Tser Huang	\$8,000
National Science Foundation (NSF)	Dr. Srihari Nelakuditi	\$12,000
Adrian Group, LLC (TAG)	Dr. Song Wang	\$89,042
National Science Foundation (NSF)	Dr. Jose M Vidal	\$123,553
National Science Foundation (NSF)	Dr. Srihari Nelakuditi	\$12,000
University of North Carolina at Charlotte/NSF	Dr. Caroline M. Eastman	\$20,461

III. B. 13. continued Sponsored Research Awards FY08 thru 12/31/2008 by sponsor

Electrical Engineering

Sponsoring Agency	PI Name	Amt First Yr
Department of Defense Missile Defense Agency	Dr. Asif Khan	\$1,049,395
Sensor Electronic Technology (SET)/DoD	Dr. Grigory Simin	\$10,000
	Dr. Roger A	
National Science Foundation (NSF)	Dougal	\$10,000
CREE	Dr. T. Sudarshan	\$50,000
US Army Research Office	Dr. Asif Khan	\$2,261,000
	Dr. Roger A	
Florida State University/ONR	Dougal	\$1,594,000
	Dr. Yong-June	
Santee Cooper	Shin	\$25,000
Sensor Electronic Technology (SET)Inc./US Navy	Dr. Grigory Simin	\$10,000
	Dr. Roger A	
MTC Technologies/US Army	Dougal	\$21,872
	Dr. Roger A	
Office of Naval Research(ONR)	Dougal	\$120,000
	Dr. Roger A	
Sky Power	Dougal	\$8,153
National Science Foundation (NSF)	Dr. Goutam Koley	\$93,002
National Science Foundation (NSF)	Dr. Yanqing Deng	\$190,138
Mobile Manufacturers Forum (MMF) and GSM Association (GSMA)	Mohammad Ali	\$71,608
Mobile Manufacturers Forum (MMF) and GSM Association (GSMA)	Mohammad Ali	\$48,917
Office of Naval Research (ONR)	Dr. T. Sudarshan	\$22,730
Office of Naval Research (ONR)	Dr. T. Sudarshan	\$14,882
	Dr. Yong-June	
National Science Foundation (NSF)	Shin	\$113,772
US Army Research, Development, & Engineering Command & Acquisition Center (DARPA)/DOD	Dr. Asif Khan	\$149,319

III. B. 13. continued Sponsored Research Awards FY08 thru 12/31/2008 by sponsor

Mechanical Engineering

Sponsoring Agency	PI Name	Amt First Yr
DOE Golden Field Office	Dr. K. L. Reifsnider	\$894,718
ExxonMobil Chemical Company & Yokohama Rubber Co. Ltd	Dr. K. L. Reifsnider	\$100,000
General Electric Company	Dr. Xiaodong Li	\$1,200
General Electric Company	Dr. Xiaodong Li	\$75,000
General Electric Company	Dr. Xiaodong Li	\$12,000
General Electric Company	Dr. Xiaodong Li	\$24,000
General Electrical Company	Dr. Xiaodong Li	\$17,000
General Motors R&D Center	Xiaomin Deng	\$69,295
Holopack International	Dr. David Rocheleau	\$69,525
Lockheed Martin Aeronautics Company Advanced Development Programs	Dr. Anthony Reynolds	\$43,052
Lockheed-Martin, Marietta, GA	Dr. Anthony Reynolds	\$48,989
National Academy for Nuclear Training	Dr. Travis Knight	\$25,000
National Academy for Nuclear Training (NANT)	Dr. Travis Knight	\$25,000
National Science Foundation (NSF)	Dr. Michael A. Sutton	\$18,000
National Science Foundation(NSF)	Dr. Victor Giurgiutiu	\$6,060
North American Rescue Products, Inc.	Dr. David Rocheleau	\$24,540
Sandia National Laboratories/DOE	Dr. Xiaodong Li	\$20,000
Sandia National Laboratories/DOE	Dr. Jamil Khan	\$165,676
SC Commission on Higher Education	Jed Lyons	\$625
SC Department of Agriculture	Dr. J. Morehouse	\$61,500
SC EPSCoR Program	Dr. Travis Knight	\$5,207
SC National Guard/DOD	Dr. Abdel Bayoumi	\$500,000
SC National Guard/DOD	Dr. Abdel Bayoumi	\$437,035
SC National Guard/DOD	Dr. Abdel Bayoumi	\$400,000
SC National Guard/DOD	Dr. Abdel Bayoumi	\$357,000
SC Research Authority(SCRA)/SC EPSCoR	Dr. Michael A. Sutton	\$10,000
SC Space Grant Consortium/NASA	Dr. Michael A. Sutton	\$10,000
SC Space Grant/NASA	Dr. Michael A. Sutton	\$20,000
SCUREF/WSRC/DOE	Dr. Yuh J Chao	\$31,755
South Carolina Research Authority (SCRA)	Dr. K. L. Reifsnider	\$200,000
South Carolina Space Grant/NASA	Dr. Anthony Reynolds	\$20,000
Surface Treatment Technologies STT/Air Force Research Lab	Dr. Anthony Reynolds	\$30,000
Surface Treatment Technologies, Inc./ONR	Dr. Anthony Reynolds	\$55,000
University of Georgia / NSF	Dr. Xiaodong Li	\$46,063
US Civilian Research Development Foundation(CRDF)/State Department	Dr. Jamil Khan	\$120,000
US Department of the Air Force (AF"OSR)/DOD	Dr. Victor Giurgiutiu	\$147,657
US Nuclear Regulatory Commission	Dr. Jamil Khan	\$138,235
Westinghouse Electric Company LLC	Dr. Xiaodong Li	\$130,000
Westinghouse Electric Corporation	Dr. Jamil Khan	\$40,949

14. **Total extramural funding processed through SAM in FY 2008, and Federal extramural funding processed through SAM in FY2008. (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 FY08, and Total Extramural Funding in FY08

Department	Federal Amounts	Total Amounts
CHE	3,959,865	5,872,588
CEE	1,945,392	2,576,420
CSE	981,873	981,873
EE	6,086,172	6,454,749
ME	4,068,097	5,097,576
Total	17,041,399	20,983,206

15. **Total research expenditures per tenured/tenure-track faculty for FY 2008, by rank and by department if applicable.**

Department	TTF	Res Exp/TTF
CHE	18	\$372,070
CEE	16	\$84,455
CSE	21	\$82,826
EE	14	\$418,863
ME	23	\$173,758

16. Amount of sponsored research funding per faculty member for FY 2008 (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.	1,091,210	65,078	215,452	1,371,740
Matthews, M.A.	32,738	20,000	56,720	109,458
Ploehn, H.J.	63,160			63,160
Popov, B.N.	250,000	126,266	50,000	426,266
Ritter, J.A.	596,570		10,000	606,570
Van Zee, J.W.	260,000		595,106	855,106
Weidner, J.W.	226,068		15,477	241,545
White, R.E.	225,000			225,000

Chemical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Gatzke, E.P.	37,500		90,000	127,500
Jabbari, E.	80,000		75,000	155,000
Williams, C.T.	100,731		124,743	225,474

Chemical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Moss, M.A.	159,919		109,000	268,919

Civil and Environmental Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Baus, R.L.	172,847			172,847
Chaudhry, M.H.	681,726	236,550		918,276

III. B.16. continued -Sponsored research funding amount per faculty for FY2008

Civil and Environmental Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Flora, J.V.	40,000		24,643	64,643
Gassman, S.L.	69,144			69,144
Pierce, C.E.	216,109			216,109
Ray, R.P.	64,902			64,902
Rizos, D.C.	119,989			119,989
Ziehl, P.H.	491,000		75,000	566,000

Civil and Environmental Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Caicedo, J.M.		141,623		141,623
Goodall, J.L.	89,675	52,488		142,163

Computer Science and Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Eastman, C.M.	25,098			25,098
Valtorta, M.	43,680			43,680

Computer Science and Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Nelakuditi, S.	92,000			92,000
Wang, S.	113,172			113,172

Computer Science and Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Tang, J.	196,279			196,279
Valafar, H.	511,644		3,000	514,644

III. B.16. continued- Sponsored research funding amount per faculty for FY2008

Electrical Engineering Professors

Faculty	Fed Competitive	State	Other	Total
*Dougal, R.D.	1,217,804		8,153	1,225,957
*Khan, A.	1,062,649		79,477	1,142,126
Sudarshan, T.S	52,610			52,610

*Federal Non-competitive funding Dougal, \$1,501,409, Florida State Univ/ONR;

* Federal Non-competitive funding A. Khan, \$500,000, DoD

Electrical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Ali, M.			216,663	216,663
Monti, A	305,000		14,284	319,284
Santi, E.	698,887			698,887
Simin, G.	10,000			10,000

Electrical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Koley, G.	264,606			264,606
Ponci, F.	95,400			95,400
Shin, Yong J.	377,807		50,000	427,807

III. B.16. continued- Sponsored research funding amount per faculty for FY2008

Mechanical Engineering Professors

Faculty	Fed Competitive	State	Other	Total
Bayoumi, A.E.	757,000			757,000
Chao, Y.J.	31,755			31,755
Giurgiutiu,V	53,000			53,000
Khan, J.A.	368,675		40,949	409,624
Lyons, J.S.	339,556	111,360		450,916
*Reifsnider, K.	105,902		100,000	205,902
Reynolds, A.P.	109,030		313,989	423,019
Sutton, M.A.	349,304	41,247		390,551

***Reifsnider non-competitive federal funding \$1,476,000, DOE**

Mechanical Engineering Associate Professors

Faculty	Fed Competitive	State	Other	Total
Baxter, S.C.			2,867	2,867
Li, Xiaodong	172,000		154,000	326,000
Rocheleau, D.N			94,065	94,065

Mechanical Engineering Assistant Professors

Faculty	Fed Competitive	State	Other	Total
Knight, T.	271,875	5,207	25,000	302,082

III.B.17. Percentage of unit faculty with sponsored research activity for FY 2008

CHE	CEE	CSE	EE	ME
100%	94%	55%	85%	65%

III.B.18. Number of faculty serving as co-investigators in cross-unit grant applications in FY 2008.

CHE	CEE	CSE	EE	ME
7	8	6	0	9

III.B.19. Number of faculty cross-appointed in Centers and/or Institutes in FY 2008.–

No college faculty paid by Centers or Institutes

III.B.20. Number of patents, disclosures and licensing agreements in calendar year 2008.

CHE	CEE	CSE	EE	ME
8	0	0	11	9

III.B.21. Number of proposals submitted to external funding agencies during calendar year 2008 (by type and by department if applicable).

Department	Federal	State	Other	Total
CHE	54	3	27	84
CEE	21	1	13	35
CSE	40	0	3	43
EE	34	3	7	44
ME	64	3	18	85
Total	213	10	68	291

C. Faculty Hiring:

III.C.22. Number of full-time faculty hired for AY 2008-09 (by department if applicable), and by rank.

Department	Assistant Professor	Associate Professor
CEE	3	1
CSE	1	
EE	1	
ME	1	

III.C.23. Number of post-doctoral scholars (Ph.D., non-faculty hires) in FY 2008.

Department	Post-doctoral scholars (Ph.D., non-fac hires)
CHE	6
CEE	4
CSE	2
EE	6
ME	11

III.C.24. 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. Please describe planned hiring over the next five years (by department if applicable).

Department	Faculty	TERI end date
CHE	Van Brunt, Vincent	9/30/2009
CEE	Baus, Ronald Lee	6/30/2010
ME	Morehouse, Jeffrey, H.	12/31/2011
CHE	Stanford, Thomas G.	5/31/2012

III.C.25. Number of Faculty Excellence Initiative (FEI) applications submitted in AY 2007-08; number approved.

Ten (10) submissions, two (2) approvals

III.C.26. List Center of Economic Excellence endowed chair applications submitted for AY 2008-09; note those approved. No submissions.

III.C.27. Number of Centenary Plan (CP) applications submitted in AY 2008-09; number approved. No submissions.