College of Engineering & Computing

Blueprint for Academic Excellence

March 2015

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 Statement

To be a Leader in Engineering Education through Vigorous and Leading Research which will be of benefit to the Economy of the State of South Carolina, and to the United States.

The mission of the College of Engineering and Computing needs 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.

Section I. Executive Summary

The College of Engineering and Computing has made steps in all the key performance parameters listed in the Provost's Guidelines for the 2015 Blueprint for Academic Excellence; Teaching Excellence, Research/Scholarship Reputation and Productivity, Service to State/Community/Profession and University, and Sustainability of our mission fiscally and through effective actions.

The first three parameters are, of course, included in all assessments of faculty performance and especially at promotion and review time. However, steps have been taken to enhance and encourage faculty to higher achievement levels:

Teaching Excellence: It is gratifying to see the importance given by faculty in promotion reviews to teaching excellence, but the College is now able to give greater prominence to teaching quality through the award of six Faculty Teaching Fellows to faculty nominated by their respective departments for their dedication to teaching quality and excellence – this has been made available through income from the AT&T BellSouth Teaching Chair. Fellows are appointed for a three year period, renewable for one further period of three year and a salary supplement is awarded.

Research/Scholarship Reputation and Productivity: A greater prominence is being given to collaborative projects that has led to a bigger number of large collaborative proposals that also include other colleges and other universities. Wherever possible, CEC faculty are being encouraged to assume leadership positions in such proposals. As to *reputation*, the College is pursuing the creation of a number of national and state-oriented workshops/conferences that will highlight our strengths in certain areas, e.g. Aerospace, Materials, Energy, and cyber security.

Service to State/Community/Profession and University: The College and its faculty are increasingly being asked to collaborate with the Office of Economic Engagement and several economic development agencies in the state in attracting industry to the area.

Sustainability of the Mission: Throughout the past year the College has worked extensively with the university and its officers to create and improve the processes for fiscal responsibility. In doing so, many undocumented issues came to light, which were both positive and negative. We are confident that the college is better set to move forward fiscally than it was previously and can do so with confidence. In addition, the College has created new revenue generation programs.

Effect of a 5% budget cut:

More detail of the accomplishments and subsequent needs will be shown in the next section "College of Engineering Computing Review". However, a summary of the consequences of a 5% recurring budget cut will be to,

- Stop all faculty recruiting whether it be for new or replacement hires.
- Stop hiring of all instructors.
- Require a reduction in student numbers at undergraduate level (which will also mean a cut in fee income).

The College is already suffering from high undergraduate enrollments that continue to rise (see later figures and data). Small classroom size leads to the requirement for multiple sections that necessitates a bigger teaching load on faculty – student/faculty ration has risen from ~18:1 to ~22:1. Inevitably this will impact our ability to sufficiently raise research funds, and also have consequences on faculty retention.

(NB. Exactly 4 years ago the College presented a document to the Blueprint stating that there was a projected shortfall in college recurring funds of $1.7M, and that the state of the College finances was 'parlous' – since then undergraduate student enrollments have increased by ~40%)

Effect of a 5% budget increase ($1,038,000):

- Consider more faculty hiring to cover larger undergraduate enrollments and an increasing diversity of course offerings (e.g. Aerospace)
- Consider hiring a grant writer
- Consider return of IDC to departments and faculty

NOTE:

A recent report from the Darla Moore School of Business points out that South Carolina needs an additional 114,000 college graduates, 44,000 in the healthcare area and a significant number in STEM disciplines. The College of Engineering has been increasing its undergraduate population at a prodigious rate, has been working with industry and commerce to provide an even greater number of graduates with IT skills (Applied Computing), increasing interaction with state-wide technical colleges to facilitate transfer students, and direct collaboration with industry to provide continuing education at all levels for the existing workforce including terminal masters degrees. To match this increase in output the Careers Advisory Service has increased employer participation in career fairs by 25% each Spring for the past 3 years.

College of Engineering & Computing - Review

We have a mission statement that conveys a very important message for all of our stakeholders:

> **To be a Leader in Engineering Education through Vigorous and Leading Research which will be of benefit to the Economy of the State of South Carolina, and to the United States.**

This sends a very powerful and positive message about who and what we are, and where we need to be going.

The last three and half years as Dean have been very challenging and very rewarding, both professionally and personally. Having spent over 15 months (plus after-effects) under continuous treatment for cancer my effective time in office is, in reality, just over two years (the diagnosis of cancer was 18 months into my time in office). That said I believe that I have delivered significant achievements for the College, the University, and the State, with:

- ❖ 50 % Increase in Undergraduate Student Numbers and Improved Student Quality
- ❖ A College that is Responsive to Needs of Industry and State
- ❖ Development – Over 400% Growth from 2011 to 2014
- ❖ Successfully Raised the College Profile in the University and the State through Marketing
- ❖ Improved Faculty and Staffing Structure, Efficiencies and Incentives

Together these initiatives, and their results have positioned the College to be a leader in South Carolina.

We have a number of strong areas in the college that have been recognized in the NRC rankings published 4 years ago. This showed that Faculty Research Productivity was the highest in the State (for engineering and computing), which placed the college with a significantly higher ranking than the perceptions allowed at that time. Most notably Electrical Engineering ranked in the top 10 in the nation, Chemical Engineering in the top 30, Mechanical Engineering in the top 35.

We do not need to do much, if anything, to improve our research quality, but we do need to make sure that the prominence of

In the latest National Research Council Survey rankings

Chemical Engineering ranked *in the top 20s in the Nation*

Electrical Engineering ranked *in the top 10 in the Nation*

Mechanical Engineering ranked *in the top 30s in the Nation*

and **all of our departments** ranked *first in South Carolina*!
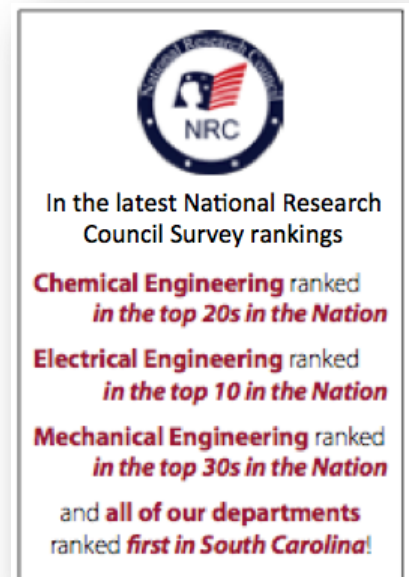
the College's capabilities are made clear to everyone in South Carolina and beyond, as well as *inside the university*.

We are the State's **Flagship University**, the only **Carnegie 1 Institution** in the State, with the **highest NRC rankings** in the State and we are *now* being recognized as such.

To that end we have put in place a range of measures that have assisted the college in meeting the goals with greater recognition, higher levels of student applications and enrollments, greater research investment and support from industry, and also recognition from all sectors of the State of South Carolina that the College of Engineering & Computing is at least equal (if not stronger in some areas) to that at Clemson University.

While we have made significant progress, there is more work to be done.

50 % Increase in Undergraduate Student Numbers and Improved Student Quality (data as of Sept. 15, 2014)

CEC has increased student enrollments while also increasing student quality (higher SAT score average). **More Freshman students from the College of Engineering & Computing were in the Honors College in Fall 2013 than any other college at USC.**

Undergraduate student enrollments have been steadily increasing in the college since 2007 (2006 number was ~1100 students, 2014 number is ~2500). Bigger jumps in numbers have occurred in Fall 2012 and Fall 2013 – Fall 2013 Freshmen numbers were up by ~30% over the previous year, and Fall 2014 undergraduate student numbers were up 12.5% (data as at 5th September 2014).
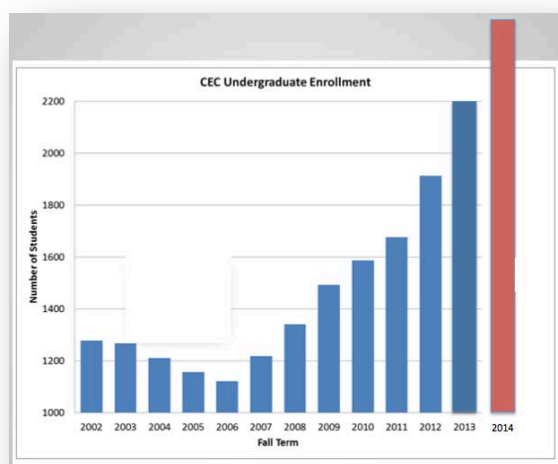
The graduate student population is skewed towards Ph.D. students with approximately 2/3 of the College's graduate population being for Ph.D. and only 1/3 for Masters degrees. Some disciplines, such as Chemical Engineering, are traditionally not oriented
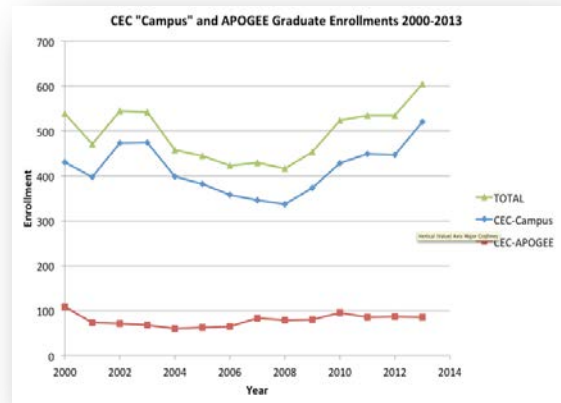
towards masters degrees, but this is not usually the case for other engineering and computing disciplines. A more usual distribution would be 2/3 masters degree and 1/3 Ph.D. The aim is *not* to reduce Ph.D. student numbers but to dramatically increase the numbers of those doing masters degrees. This change directly supports the needs of the developing economy of the state, especially when these Masters programs are offered in a format convenient to the full-time working professional. The college is increasingly 'marketing' the *accelerated masters degree* to all incoming students and, again, to juniors in time for their senior year studies. We need to develop more ways to encourage US Citizens and Permanent Residents to apply for graduate studies (this is a similar problem to that of most engineering and computing colleges in the US). To that end we have been actively creating new degree programs with industry and commerce needs at the forefront.

A College that is Responsive to Needs of Industry and State

The College of Engineering and Computing has been establishing a pro-active leadership role both inside and outside the university. To be successful the college must demonstrate its success to all of its constituents in a range of ways:

College Advisory Board

The advisory board for the college was re-constituted and now meets twice per year. We have placed more emphasis on senior executives of companies in the State who are able to make decisions on behalf of their companies to support the College, and who can provide the College with insight into how best to support industry. They are actively encouraged to constructively critique the college.

Leadership Through Collaboration: College is Responsive to Needs of Industry and State

University & Industry Collaboration

Collaboration of almost any sort leads to positive outcomes, creating new programs and more efficient use of resources.

The programs described below have all been **created expressly to meet the needs of industry and the State**. We have a duty, as a state and flagship university, to provide industry with the people it needs to hire, to provide continuing education for the existing workforce, and thus supporting economic development.

Energy Systems (Industry and Across-Campus Collaboration). In the energy field we continue to build cooperation across 6 colleges (Arts & Sciences, Business, Law, Public Health, Mass Communications, Engineering & Computing) and are seeing multi-disciplinary research proposals being created. We are being asked by industry to look into producing engineers better suited to take over roles in the energy utility field due to a large and ageing workforce. The establishment of the Energy Leadership Institute was created to coordinate these efforts – we have had feedback directly from senior executives that *big and significant* initiatives such as this are what USC needs to raise its profile and investment.

Biomedical Engineering (Across-Campus Collaboration), after 7 years, this is already 2nd or 3rd biggest undergraduate program in the College and works in conjunction with the Medical School. We are to extend collaboration to include Pharmacy, Public Health, and Nursing to increase the breadth of the program and to yield more opportunities for graduate study. We have just had approval from CHE for a joint Masters degree with Clemson in Biomedical Engineering. This program is also a route whereby we can attract more women to the college…subject to more investment.

System Design (Industry and Across-Campus Collaboration). Increasingly engineering and computing are interdisciplinary in nature and on graduation our graduates find themselves working directly with graduates of other disciplines. The complexity of modern products requires that people have a level of understanding outside their major. This program has been created to address this and is interdisciplinary across the college – it has been created for industry with their input, and clearly points to the need for more collaborative research including the whole of the College of Engineering & Computing but also with, for example, Psychology as there is an increasing need for *human factors* input in our discipline.

Engineering Management (Industry and Across-Campus Collaboration). Engineers and computer scientists need to have an understanding of management methods as this is *essential* to their job. Unfortunately a BS degree in engineering and computing is limited with what it can add due to the number of credit hours already required for the degree, and pressures such as ABET accreditation. Previously, the only way to get management training was either on-the-job or by studying for an MBA which is unsuited to the skillset required to manage complex engineering projects. The Engineering Management masters degree was created explicitly to address this need and has classes provided by the Moore School of Business, College of Mass Communications, and the Law School. Notably, one of the classes is being offered by faculty from The Citadel.

Applied Computing (CoursePower) **(Industry and Across-Campus Collaboration)**. Industry and commerce indicated that they were unable to hire sufficient graduates with IT skills. A collaboration was set up which included IT-oLogy, Columbia College, Midlands Tech., and Benedict College to create an undergraduate minor degree that *anyone* would be able to take and gain the qualification. This was led by the Department of Computer Sciences & Engineering at USC and implemented after only 6 months. The first semester saw ~1,000 students register from across the USC campus starting Fall 2013.

USC Upstate, USC Aiken, USC Beaufort. We have made extra efforts to ease the path for students completing 2 year degree programs at USC Upstate, USC Aiken, and USC Beaufort to be able to continue towards 4 year degrees and have MOUs in place. We have given strong support, curriculum and ABET accreditation advice, to USC Aiken in their moves to create their first 4 year engineering degree program in Industrial Process Engineering.

Cyber Security Center of Excellence. Our NSA recognized education and research capability in cyber security (the only one in the state), with the assistance of Maj. Gen. Eisner, is working with the SC National Guard, SPAWAR, SRNL, Clemson University, and the College of Charleston to create a Cyber Security Center of Excellence for the State. We intend to include USC Aiken as an allied institution in this project.

Aerospace/McN*AIR* (Industry and Across-Campus Collaboration) – this program draws many disciplines from within the College and should be aligning them with other resources, such as the business school, to provide a center of competence for the Aerospace Industry. The significant investment in the McN*AIR* Center is helping with research infrastructure and in providing a compelling case for further investment and student applications.

Law School Scholarships (Across-Campus Collaboration). In collaboration with the Law school we are creating a pathway for graduating engineers and computer scientists to move on to a law degree. A scholarship fund has been set up and is already modestly funded. The combination of engineering/computing with a law degree is a powerful combination for both Intellectual Property law and Product Liability issues, and in great demand by commerce.

Direct Collaboration with the Moore School of Business - The Moore School of Business created a new position for a 'clinical' faculty position to support entrepreneurship. I was asked to serve on the interview panel. It was immediately clear that this position, and the person selected (Dirk Brown), would be of direct benefit to the College of Engineering and Computing. I suggested to the then Dean (Hildy Teegen) that we make it a partially joint appointment. An agreement was reached, and this has also enabled closer collaboration between our two colleges other than just on the topic of entrepreneurship.

Collaboration with Other Academic Institutions. We are working on collaboration with Clemson University to offer graduate degree programs and certificates that will be appealing to industry in South Carolina such as Boeing. The structure fits in with existing academic legislation in both institutions and 'joint' degrees can be offered. The College of Engineering & Computing is already collaborating with The Citadel (Engineering Management) and will be collaborating with the College of Charleston with System Design. In all these cases it is this college that is leading and driving the collaboration.

Many of the programs will be offered in a format that is aimed at the full-time working professional (eg. one weekend per month) and utilizing the resources of the Low Country Graduate Center (Charleston),

University Center (Greenville), as well as those of USC. We will need to extend our ability to offer more of our classes electronically.

> *Together these initiatives clearly demonstrate that **the College of Engineering & Computing is leading the way both inside the university, and in the State, in creating collaboration**. As a small state it is critical that we maximize the utilization of our resources and minimize duplication.*

Leadership Outside the University

It is clear that South Carolina is not very good at marketing itself! This affects the state in different ways – both through potential new investment not realizing what companies and resulting infrastructure is already here, but also that the citizens of the state do not grasp the extent of what the state has to offer. In trying to ascertain what industry and commerce there was in the state it became apparent that the state's Department of Commerce did not have a single coherent database yielding the information. This college initiated a project, which includes the Department of Commerce, Engenuity, and the Darla Moore School of Business, to create such a database which will initially be web-based, and eventually available in print form. This will be of immense use to the economic development agencies as they search for the relevant information that prospective investors seek in determining whether to locate in the state.

The College of Engineering & Computing is the State's technical representative to the Aerospace States Association (made up from Lt. Governors). This was initiated by the Dean and Bob Kiggans (SCRA) visiting the Lt. Governor and making the suggestion (State was not aware of the Aerospace States Association).

Outreach

Outreach is crucial to the development of the College, supporting recruitment to, and funding of, our programs. It takes many forms including:

- ❖ Working with middle and high schools
- ❖ Visiting companies and inviting them to visit the college
- ❖ Working with the legislature wherever and whenever possible to demonstrate that we are a 'real' part of the value-add for the State.

We have progressively invited more companies for presentations and tours specific to their needs and this has, in turn, produced research/project collaboration as well as increased visibility and interest in hiring our students for both internships and co-ops. **S.E.T Fair Employer participation continues to increase** – Fall 2013 participation was up by 9% compared to the previous year, and **Spring 2014 participation was up by 25%**. As a result we are able to encourage more

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Evening of August 19 at the Convention Center

McNAIR
The Ronald E. McNair Center for
Aerospace Innovation and Research

of our Freshmen to attend the Fairs contributing to an overall increase in this College's student attendance of 25% compared to the previous year.

> *This is significant, as companies are reducing the numbers of universities that they visit to hire graduates from.*

Economic Development

The College of Engineering and Computing is part of the reason why industry and commerce would want to move to, or expand in, the State. It helps, of course, that we are also doing research that is relevant to industry and the State. An Economic Impact study for the College was commissioned with an outside agency to demonstrate the value of the College to the state taxpayer – the report showed that **for every $1 of state funds the College returns ~$6 to the South Carolina economy**.

The College works directly with the economic development agencies of the state including Central SC Alliance, Upstate Alliance, as well as SC Department of Commerce. As Dean I have participated with several meetings at the request of these organizations including overseas trips. Consequently *this* college is increasingly recognized as directly beneficial to the economy of the state.

Research Focus/Direction

New Chairs brought to the College in the last 3.5 years:

Regalbuto, John (Chemical Engineering) Hired 8/16/2011
SmartState Chair in Renewable Fuels for the Fuel Cell Economy

Cacuci, Daniel (Mechanical Engineering) Hired 1/1/2012
SmartState Chair in Nuclear Science and Energy

Bessman, Ted (Mechanical Engineering) Hired 11/16/2014
SmartState Chair in Nuclear Science Strategies

Gurdal, Zafer (Mechanical Engineering) Hired 1/1/2013
McNair Endowed Chair and Center Director

We are in the final stages to hire the SmartState Chair in Multi-Physics of Engineered Functional Materials.

In addition to the recruitment of tenured/tenure track faculty, the chair appointments are significant in their potential impact on the research success and recognition of the college.

With these leaders, and with the tremendous success of our other faculty (who produced the superb NRC research rankings), we can do more to

Workshop on Combinatorial Approaches To Functional Materials

raise our 'perceived' profile at all levels. We have organized cross-campus workshops on the topic of energy and been able to invite distinguished speakers from around the country. We are also making the point to be associated directly with national and state events.

With the Creation of the McN*AIR* Center we were able to take the annual SC Aviation Association Dinner organized with the Department of Commerce and turn it into a whole day 'event' with corporate sponsors, technical sessions, panels, and distinguished speakers – thus raising the profile of the state's presence in the aerospace business, and indelibly linking its success and future to the University of South Carolina.

On a more modest scale, the College was the only academic sponsor of the national workshop on 'Combinatorial Approaches to Functional Materials'.

We have plenty of opportunities such as this to relatively easily raise our profile – we were planning to organize an invitation-only mini-workshop 10 months ago to create a white paper/Roadmap on the 'Future of Research in Aerospace Composites'. Unfortunately this had to be postponed because of sequestration (major input was planned from the national laboratories, Air Force Office of Scientific Research etc., and invitees from Europe) – we have since found out that NIST is now organizing a similar event! However, we are now planning white paper/roadmap events on 'Advanced Composites Manufacturing', and 'Energy Security for the US' in the coming months.

Development – Over 400% Growth from 2011 to 2014

The primary development officer had left the college prior to my arrival. After an extensive search CEC hired an extremely competent person in Lori Ann Summers (from University of Alabama, Auburn), who then hired Jeff Verver. Their results, shown on the accompanying graph, speak for themselves!

The hiring of these two new Development Officers came at a very opportune time as the College needed to change its direction in fund raising away from finding matching funds for SmartState Chairs, to the more traditional (but no less important) approach to alumni and personal giving. Interestingly this has led to a higher overall level of giving **making this College's performance the second highest at USC this year** (after Arts & Sciences).

College of Engineering and Computing Giving

FY10 $2.5 | *FY11 $3.1 | FY12 $4.6 | FY13 $5.7 | FY14 $10.4

*Does not include an $18 million in-kind software gift

Student Scholarships

This new Development team quickly identified other deficiencies in our operations, for example with scholarships ~1/3 were not being utilized. We initiated a practice to use up *all* our scholarship funds for the
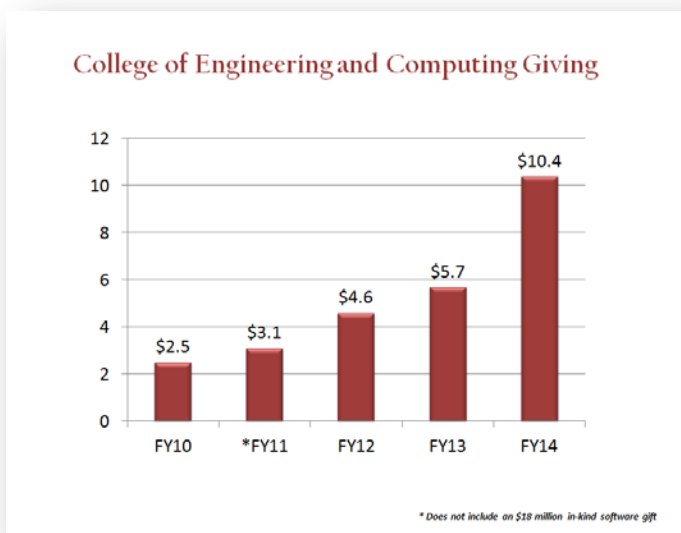
betterment of our students, and enabling Development to go out to donors to ask for more scholarship donations. 329 different students were awarded a college scholarship this year; this is a 23% increase in the number of students impacted in the last two years (in FY12, only 266 students were awarded college scholarships)

Successfully Raised the College Profile in the University, and the State through Marketing

The College now approaches marketing as a strategic initiative that directly affects the success of the College. A priority was to do a better job with marketing the presence and accomplishments of the College – who we are, that we're here, that we're good, that we have a range of exciting programs (undergrad and grad) to offer, the research is of excellent quality, the faculty can be placed among the top in the country, that we are here to serve the needs of the State and the State's taxpayers, that we are a 'value-add' to the State's attempts to bring new industry and commerce to the State.

There were many hurdles to deal with – it is clear that the university does not approach marketing in the same way as, for example, Clemson does, so the problem had to be addressed on several fronts. We have been working with our new marketing hire, Kathryn McPhail, to boost awareness of the College as well as providing better access to information about what we do at all levels;

- ❖ Through outreach (K-12)
- ❖ Big Friday recruiting events (parents/prospective undergrads) – attendance up by a factor of *3 since 2013
- ❖ Industry liaison (tours, invitations, open days).
- ❖ College brochures and other collateral materials needed updating; this has been done and continues to be reviewed so that they remain relevant and accurate.

To further underscore these initiatives and raise awareness of the College with industry, commerce, and the legislature, we held our first 'Open Day' in November 2013, which was attended by over 60 guests. We also extended invitations, that were accepted, to **Lt. Governor O'Connell**, and **Secretary for Commerce Bobby Hitt** for personal tours of the College.

Based on this success we plan to make this an annual event. We are working with Trey Walker (USC's Legislative lobbyist) to reach out to the legislators.

Improved Faculty and Staffing Structure, Efficiencies and Incentives

There was a need to hire at a number of key positions – Dean's Assistant, Budget Manager, Web/Marketing person, two development officers, Associate Dean for Student Affairs. Created one new position as Associate Dean for Industrial Liaison.

Inevitably, on a change of leadership, there are a number of changes that result. Significantly I had to appoint a new Dean's Assistant, and over the succeeding months it became apparent that the college needed:

A New Budget Manager - In January 2011, when I arrived, it was clear that the budget had a deficit and a decision was made to appoint a new Budget Manager. Given the operating budget deficit ($801,580 in FY11 – an actual deficit of $2.3 million when one-time committed funds are removed), a change in budget processing was key to getting a clear view of the college budget and to getting to a balanced budget. A more in-depth study has shown that the deficit was partially the result of a change in university funding models (moving away from VCM to a partial recentralization budget model) as well as an over-reliance on one-time funds. In spite of this rocky beginning, with a new budget manager, Kay Dorrell, along with support from the Provost Office and Christine Curtis during my illness the college now has a balanced budget.

Two Development Officers – the College's senior development officer left before my arrival, and the junior person did not feel qualified to support the engineering and computing discipline. The College now has a 4x increase in development income.

A Web/Marketing Person – key to getting the college better recognition; has dramatically improved marketing at all levels including access to potential students (both undergraduate and graduate), companies who want to hire our graduates and/or want to have research interaction, potential faculty hires, and to the legislature.

Associate Dean for Student Affairs – previously the College had a non-academic Assistant Dean in this position. I deemed it essential that such a role was led by a tenured academic.

Associate Dean for Industrial Liaison – it is increasingly important that the college work directly with industry. We have a responsibility to make sure that we serve the industry and commerce within the state (but also outside the state) and make them aware of what we have to offer, and to make sure that we are also able to provide them with the graduates they need to hire, and relevant research wherever possible. We liaise with the State's technical colleges helping the state to show a more seamless provision of capabilities.

Associate Dean for Research & Graduate Studies – the role of Associate Dean for Research was expanded to include graduate studies and graduate student recruitment.

Staffing Structure – In line with budget changes and the new Budget Manager, a reorganization was made of the budget process in the college, centralizing the budgeting of the departments to ensure a more adequate control of finances.

Mutual Respect – Equal Workload - Incentives

It is very easy to look only at the researchers in academia. We need to note that *good* teachers can provide the researchers with more time to do research – of course, good researchers can enthuse the younger students with the will to succeed in their chosen field. In a top institution, good teaching is just as important as research.

So we need to be able to recognize both attributes of faculty member's capabilities. We already have numerous awards for research excellence, but now we can, within this college, recognize excellence in teaching with the first awards of the **AT&T Bell South Teaching Fellows**. This award can be given to up 6 faculty at any one time, awarded for three years, renewable for one further period of three years, and a salary uplift of $6K per annum. The group of Teaching Fellows are tasked with advising the college on teaching needs – their first task is to advise on what distance learning technologies to implement in many of our classrooms.

It has also been agreed to implement a ***Faculty Incentives Program*** whereby faculty may apply for a one course teaching relief in one semester in order to:

- ❖ Create a new program
- ❖ Write a book
- ❖ Put together a large research consortium
- ❖ etc…

…a written proposal must be submitted for review by a department committee. On approval, the faculty will write a report on their activities in that semester – any future application for teaching relief (no sooner than 5 years later) will include a review of the success of the previous teaching relief.

Communication

Communication of the aims, objectives, and direction of the college to the faculty and staff is essential. As Dean I officially meet with,

An 'All Faculty' meeting once per semester

An 'All Staff' meeting once per semester

Meet with each Department's Faculty once per semester

Meet with each Department's Staff once per semester

Meet with each Department's Advisory Boards

Meet with the College's Executive Committee (Department Chairs, Associate Deans, Program Directors) once per month

Meet with Associate Dean for Student Affairs, and the Associate Dean for Research, once per week.

During my illness this was, of course, difficult over the course of a year but I made efforts (as treatment progressed) to visit faculty meetings whenever possible.

FUTURE PLANNING

The previous discussion has highlighted the remarkable advances that the College of Engineering and Computing has made over the past few years.

There are some changes in demographic issues and a realization that the costs of higher education are such that a path to a well-paid job or career is essential in order to justify the outlay yielding increases in student numbers. That said it is also true that the modest attempts of outreach and marketing that the College has performed is making an additional, and marked, difference.

We are the 'Engineering and Computing College' of the Flagship University of the State

and should behave as such!

The College is heavily engaged with outreach and introducing more programs to excite middle and high-schoolers to the wonders of engineering and computing. The collaboration with industry and commerce to react to a shortage of graduates with IT skills led, in only six months, to a minor in Applied Computing that *anyone* on campus can register for; industry and commerce were fully engaged with this initiative which was led by Dr. Mike Huhns, then chairman of the Computer Science and Engineering department in the college. Interestingly it appears that this program has also led to a higher level of interest in a *major* in computer science (see enrollment trends figure).

The faculty of the college are producing research of a very high caliber, but research output is only a part of what makes an academic unit truly successful – "if we do good work, they will come" is *not* a recipe for success. It is an *essential* part, but by no means the totality. We need teamwork across the college *and* the university, outreach, attractive undergraduate degree programs that adapt to both technology changes and

the needs of the state as new industry relocates here, relevant and accessible postgraduate degrees (both MS and Ph.D.) for full-time working professionals, and demonstrated leadership at all levels.

As pointed out in the previous pages, a lot of work has been done in all these areas – significantly not much extra effort has been required by faculty to make this happen! New minors in many disciplines showing, for example, that a degree in mechanical engineering can lead to a career in aerospace, or that a degree in computer sciences can lead to a career in cyber security. Often, no changes are needed to curriculum but simply an added emphasis on the website and/or a new brochure.

We must continue to be proactive with the community (business, industry, legislature) in being seen and driving forward with initiatives that are of demonstrable benefit to the state, as well as the university. The Applied Computing undergraduate minor is one such example.

The College is actively promoting new schemes for outreach to the underprivileged in the state, eg the I-95 Corridor ('Corridor of Shame'). We have proposed to the university's Chief Diversity Officer, John Dozier, that we work together on an initiative that will allow the top 10%, for example, of any high school graduating class to have access to tertiary education. This has been very successful in Texas, but the demographics of South Carolina suggest that it would not be as successful here unless we also provide scholarships and access to quality teaching for a 5th year of high school to enable those from drastically underprivileged areas a better chance to succeed in any tertiary education. This is another facet of USC showing *leadership*.

We need more teamwork – our individual faculty are superb academic research leaders in their respective fields. There is a move to organize workshop events (internally and externally to USC) and discussed elsewhere in this document.

As shown in the previous discussion and data, the College is growing. This is a direct result of our increasingly obvious presence, our outreach activities as well as a realization that a qualification in engineering and computing leads to a well-paid and lifelong career. The College is half the size of the corresponding college at Clemson University and while absolute size should not matter this does allow them to offer a wider range of degree granting opportunities as a result, which is a very good form of marketing. We now offer more options than four years ago but we have more opportunity to here to exploit and create more programs.

Four years ago I was informed by the previous Dean of this college that we needed to look to obtain more space – the situation now is ever more critical. Whilst we have been fortunate to gain access to two more floors in the Horizon Building, a new 55 seat classroom and graduate student space in the Horizon Garage, leased space in the SCRA facility on Assembly Street for the McN*AIR* Center, and research lab space in the recently vacated former Biomass facility, the listed space is all associated with new hires and new and expanding research initiatives. It does not address the basic, underlying needs of a growing student body. The students, faculty, and staff are badly served with the current space available, and the college is situated away from other communal student facilities for studying, library, eating, societies, project work etc. Additional space is crucial in the immediate future especially as President Pastides has stated his desire that the College continue to grow – it fits in with the goals of the university, and also the stated wishes of Governor Haley and the Legislature that we produce more engineers and computer scientists.

Several building options have been considered, as well as location that will best serve the college. One option being considered will cost approximately $25-30M – our excellent Development team has been looking at how best to fund the project. The figure shows a fund raising plan for 50% funding with an estimate that this will require 18-24 months to raise.

A new facility will be better able to provide secure areas for commercially sensitive work and increasing amounts of classified work as knowledge of our research expertise becomes more widely known.

DEVELOPMENT — $15M Goal

Gift Range	No. Gifts required	No. Prospects required	Subtotal	Cumulative total	Cumulative percentage
1,500,000.00	1	4	1,500,000.00	1,500,000.00	10%
750,000.00	2	8	1,500,000.00	3,000,000.00	20%
300,000.00	5	20	1,500,000.00	4,500,000.00	30%
150,000.00	10	40	1,500,000.00	6,000,000.00	40%
75,000.00	20	80	1,500,000.00	7,500,000.00	50%
38,000.00	40	160	1,520,000.00	9,020,000.00	60%
23,000.00	60	240	1,380,000.00	10,400,000.00	69%
15,000.00	100	400	1,500,000.00	11,900,000.00	79%
7,500.00	125	500	937,500.00	12,837,500.00	86%
Under 7,500.00	576	2306	2,162,500.00	15,000,000.00	100%
Totals	939	3756		15,000,000.00	

UNIVERSITY OF SOUTH CAROLINA

Work in Progress

The departments continue to look to improve their operations and make efficiencies where possible. Discussions have identified courses that are common to several of the disciplines within the college, thereby reducing faculty teaching loads.

The departments of Chemical Engineering and Electrical Engineering have worked to facilitate students who take on a co-op opportunity to continue their studies seamlessly on their return to full-time studies – we have an aim to get all departments in the college to work in a similar way.

The College needs to encourage more women and minorities to study engineering and computing. We have established a very positive working relationship with the Chief Diversity Officer to work on this problem. Biomedical Engineering is very attractive to potential women students but we are short of space to be able to accommodate a dramatically increased number.

Faculty retention is a major issue for this college – we have been very successful in the hire of junior faculty, but they are also a target for head-hunting by other institutions.
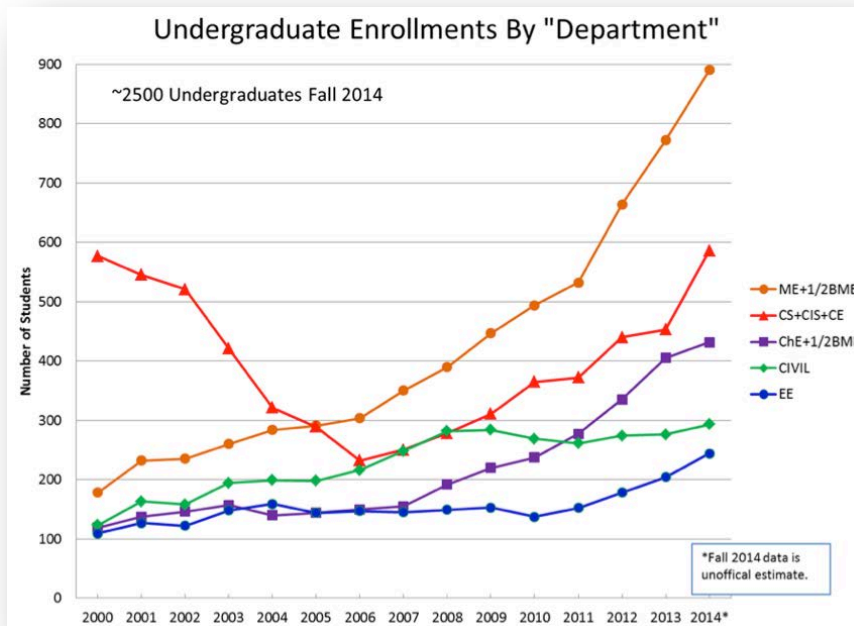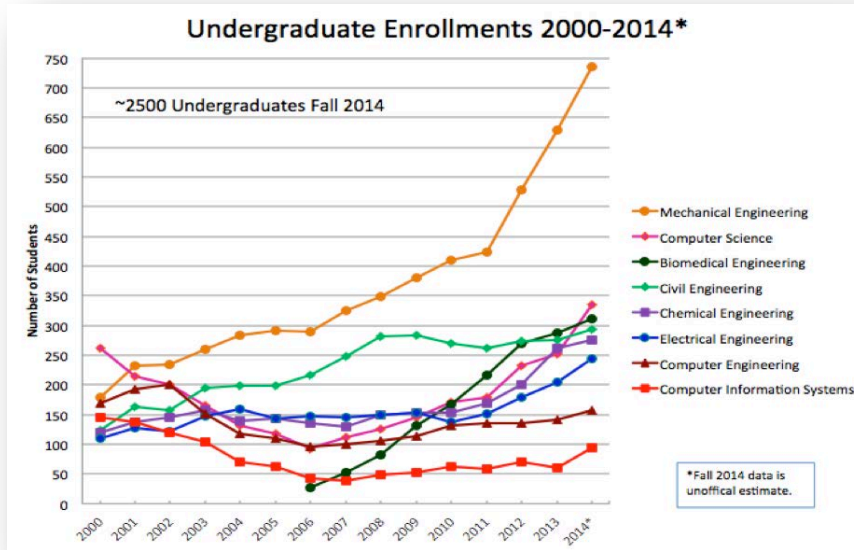
The Development team is working hard to raise more in the way of Alumni Giving – it has been very successful in making this change in direction (previous focus was more towards raising matching funds for the SmartState Chairs.

College of Engineering and Computing Alumni Giving

Year	Number of Donors	Amount Given
FY 10	530	$142,895
FY 11	428	$180,728
FY 12	434	$178,916
FY 13	467	$2.2 million
FY 14	515	$1.4 million

An issue to be confronted at some time in the near future is the establishment, or not, of a Department of Biomedical Engineering. Currently the undergraduate enrollments in this major represent the 2nd largest in the college, but the faculty directly associated with the program come from two separate departments in the college, and also from the Medical School. At the very least this can cause problems with differing tenure and promotion requirements – a unified tenure/promotion process for all 'primary' biomedical faculty is being created for debate amongst all relevant bodies in the college for submission to the Provost.

This College has the opportunity, with the support of the University, to make a tremendous impact for the benefit of the University, Columbia, and South Carolina. I believe that this College is showing the way in South Carolina.

Undergraduate Enrollments 2000-2014*

~2500 Undergraduates Fall 2014

*Fall 2014 data is unoffical estimate.

Legend: Mechanical Engineering, Computer Science, Biomedical Engineering, Civil Engineering, Chemical Engineering, Electrical Engineering, Computer Engineering, Computer Information Systems

Undergraduate Enrollments By "Department"

~2500 Undergraduates Fall 2014

*Fall 2014 data is unoffical estimate.

Legend: ME+1/2BME, CS+CIS+CE, ChE+1/2BME, CIVIL, EE

Section II. Academic Dashboard Measures

1. Total Undergraduate Enrollment

Our undergraduate enrollments have increased by 70% from Fall 2008 to Fall 2014. Freshmen enrollments increased by 13% in F2014 compared to F2013 – current projections are for Fall 2015 Freshmen enrollments to be up by ~8% over Fall 2014.   As will be emphasized throughout the Blueprint, the increased enrollment, while welcome, provides great stress on faculty, staff, space, and resources and is perhaps the single greatest driver of needed change in the college.

We aggressively recruit undergraduate students. Three full-time staff are dedicated to outreach and recruitment, and administrators and faculty are also engaged. Outreach programs include Project Lead The Way (PLTW), computer science and engineering summer camps, field study opportunities in College, and partnerships with other organizations.   We participate in recruitment events at USC and in the primary regions served. We provide daily tours of the College and frequent "Big Fridays" (attendance at "Big Friday" events increased by x3 one year ago after better 'marketing' of the event within the university). We created a new outreach event "The Edison Lecture Series) which brings high school and middle school students to campus to show them current research in an interesting and interactive way. We actively participate in the national 'Engineers Week' program and host a public Open Day on a Saturday with a large number of demonstrations around the College's facilities.

Total UG Enrollment	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Number of Undergrads	1,454	1,584	1,698	1,849	1,971	2,188	2,477
Number of UG applicants		1,935	2,111	2,525	2,940	3,191	3,397

2. Average SAT Score

Our 2014 freshmen average SAT score dropped by 12 points compared to Fall 12; this after several years of small but steady increases. We do not know whether this is statistically significant, or whether it represents a trend. Each year, hundreds of CEC students receive college scholarships…we have changed scholarship processes to ensure that all available funds are awarded. Increasing the number and amount of scholarship funds is a priority for our development office, which currently includes three full-time staff.

Freshman Profile	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Number admitted	1,327	1,493	1,687	1,958	2,275	2,460
Freshmen Class Size	392	431	485	494	618	627
Average SAT	1237	1217	1226	1226	1254	1,242

3. Freshman-Sophomore Retention Rate

While data for Fall 2014 are not yet available, in past years our retention rates have been relatively flat, and remain the lowest on campus. We have implemented several retention efforts. These include the Engineering and Computing Living/Learning Community effort, spearheaded by Professor Ed Gatzke. The Office of Student Affairs, led by Associate Dean Jed Lyons, has spearheaded efforts to provide a comprehensive and consistent set of advising guidelines and support to faculty academic advisors. Other retention activities include a strong faculty advising system. An academic program manager position, whose responsibilities include retention, was hired in

2013. We have created space for the Student Success Center to add a satellite tutoring center in Swearingen.   In the coming year, we propose to introduce a First Year Advising Program to further improve repetition.

In the previous year, we used a $100,000 incentive from the Provost's office to increase the number of summer courses offered. This should, in the long term, have a positive effect on retention because students who fall behind in the academic year will be able to catch up with more summer offerings. According to Appendix E.8, CEC generated 18% more student credit hours in Summer 2014 compared to 2013.

Fresh-Soph Retention Rates	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013
in the College	71.1%	69.2%	69.4%	65.6%	73.7%	--
at USC	82.3%	86.3%	84.0%	79.9%	86.7%	--

4. Six-year Graduation Rate
Our six-year graduation rates have increased slightly, but generally remain the lowest on campus. Data indicates that poor performance in a student's first math class correlates with student attrition. This negatively affects overall GPA, and creates course sequencing problems. Improved freshmen retention as a result of a First Year Advising Program should improve graduation rates.

Six-Year Graduation Rate	Fall 2004	Fall 2005	Fall 2006	Fall 2007	Fall 2008
from the College	35.6%	41.1%	45.3%	49.5%	--
from USC	58.6%	61.5%	64.2%	66.2%	--

5. Student to faculty ratio

The student/faculty ratio for fall 2014 is calculated with the new formula per the Blueprint instructions, and is shown in the table below (** denotes new formula). We have not corrected the calculation for previous years shown in the table, but because CEC has very few part-time students and instructors, the effect on the calculation is small. As can be seen, increased enrollments and a net loss of 4 faculty have increased the student-to-faculty ratio. The increase in PT Graduate enrollment in Fall 2013 and 2014 is due, in part, by growth of the Professional Masters in Engineering Management: Spring 2014-7 students; Fall 2014-11 students, Spring 2015-19 students. Note that student enrollments do not include the rather large service load of CSCE courses taught to non-majors.

Year	2009	2010	2011	2012	2013	2014
TT Fac Count	94	102	106	114	111	107
Lecturers	n.a.	0	0	0	0	0
Instructors	n.a.	2	3	3	3	3
UG enrollment, FT	1584	1698	1849	1971	2,188	2,324
FT Grad enroll	283	325	327	322	350	348
PT Grad Enroll	90	103	122	125	166	151
UG Stu/TT Fac	16.9	16.6	17.4	17.3	18.3	
Total FT stu/TT Fac	19.9	19.8	20.5	20.1	21.4	25.7**

CEC could indeed teach more undergraduate students if we had access to larger classrooms. Increasing the graduate student enrollment depends on availability of laboratories for research, and funds to support graduate students.

CEC has a graduate student 'mix' that is heavily weighted towards Ph.D. students – the College is looking to greatly increase MS graduate students through the creation of new programs aimed at industry, primarily within the state, and which will also be available through distance learning. The College is also marketing the availability of the *Accelerated Masters* degree more aggressively to its own students.

6. Research expenditures

The VPR's report on new awards for FY 2014 is given in the Appendix. Because awards do not necessarily translate to expenditures or IDC returns, CEC performs its own analysis of research expenditures, presented here. Data are taken from the annual ASEE survey. These expenditures do not reflect SmartState activity, for the most part. ASEE data most closely represent the real operation of the college. Another source of data is the NSF's annual report on research expenditures. However, we find that NSF overstates expenditures, and is not closely related to IDC returns. Likewise, the VPR report of awards includes subcontracts to other entities, and SmartState activities, that do not result in actual direct cost expenditures or indirect cost returns to the college. The last column below shows the approximate percentage of TT faculty in the college with funding. This column is not exact, because some research faculty have grants, but are not counted in the denominator (total number of TT faculty). The last column shows the percentage of CEC TT faculty who have active grants, and is based on 2013 data provided by the VPR.

Research expenditures by department, and IDC return, are trending down. While the high in 2011 may have been helped by SmartState activity and the very large DOE EFRC, these have largely come to an end. Our IDC returns are trending down as well, and at the time of this writing the FY2015 IDC return to the college is 30% behind the return at a similar point in FY 2014. A priority for the college is to stabilize and increase research expenditures. We need to a) insure that new hires are helped to become successful; b) compete for large grants, and to seek new long-term partnerships especially with industry and SRNL; and c) retain early mid-career faculty after they begin to have success.

FY	ECHE	ECIV	CSCE	ELCT	EMCH	Total	$/TT Fac	% TT PIs
Dept Research Expenditures, per ASEE Reports compiled and submitted by CEC								
2009	$6,145,949	$1,842,248	$1,336,086	$5,116,797	$4,224,200	$18,665,280	$198,564	59
2010	$5,867,173	$2,220,853	$1,586,337	$5,585,041	$6,922,575	$22,181,979	$217,461	61
2011	$6,971,268	$2,001,181	$1,948,763	$5,932,043	$11,266,895	$28,120,150	$265,283	75
2012	$6,085,328	$2,354,816	$2,023,981	$5,271,143	$9,320,792	$25,056,060	$223,412	72
2013	$5,057,885	$2,520,411	$2,097,241	$4,727,947	$7,081,486	$21,484,970	$194,764	77
2014	$5,119,805	$1,938,690	$1,555,523	$4,268,845	$7,675,040	$20,557,903	$192,129	

7. Faculty productivity

The College now has access to the Academic Analytics tool, and we use selected data from that to summarize faculty productivity. Each department has provided a set of five peer departments, and a complete set of AA data have been provided to the department chairs.

CEC Faculty Productivity-Academic Analytics release 2013.01.334				
Department	TT Faculty Count, F 2014	Journal pubs/faculty	Citations/faculty	Dollars/grant	Total grants
Chemical	20	13.36	177.43	$119,014	33
Civil & Environmental	20	9.63	78.11	$104,587	18
Computer Science/Eng	21	4.91	18.91	$94,738	34
Electrical	16	11.5	56.17	$144,345	38
Mechanical	30	15.04	100.1	$173,055	41

For comparison purposes, USC CEC faculty appear to be performing better ($'s)
than faculty at Clemson Engineering

8. Doctoral degrees

Doctoral degrees are shown below; other degrees are shown also. Note the strong increase in both PhDs and Master's students graduated compared to 2013. Master's productivity is expected to increase with the offering of the Executive Masters degrees. Efforts are underway to streamline and promote the Cyber Security Certificate that is specific to our college.

CEC Degree Productivity					
AY	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
Baccalaureate	227	292	289	315	295
Masters	56	88	78	62	74
Doctorate	33	29	40	49	67
Certificates	0	1	1	0	0

College of Engineering and Computing

Impacts of Undergraduate Enrollment Increases

Undergraduate Enrollment Data

From 2007-2014, undergraduate enrollment in the College of Engineering and Computing has increased by an average of 10% per year. As a result, total enrollment doubled during this time period. Another projected 10% increase from 2014 to 2015 will result in over 2700 undergraduate CEC majors (Figure 1).
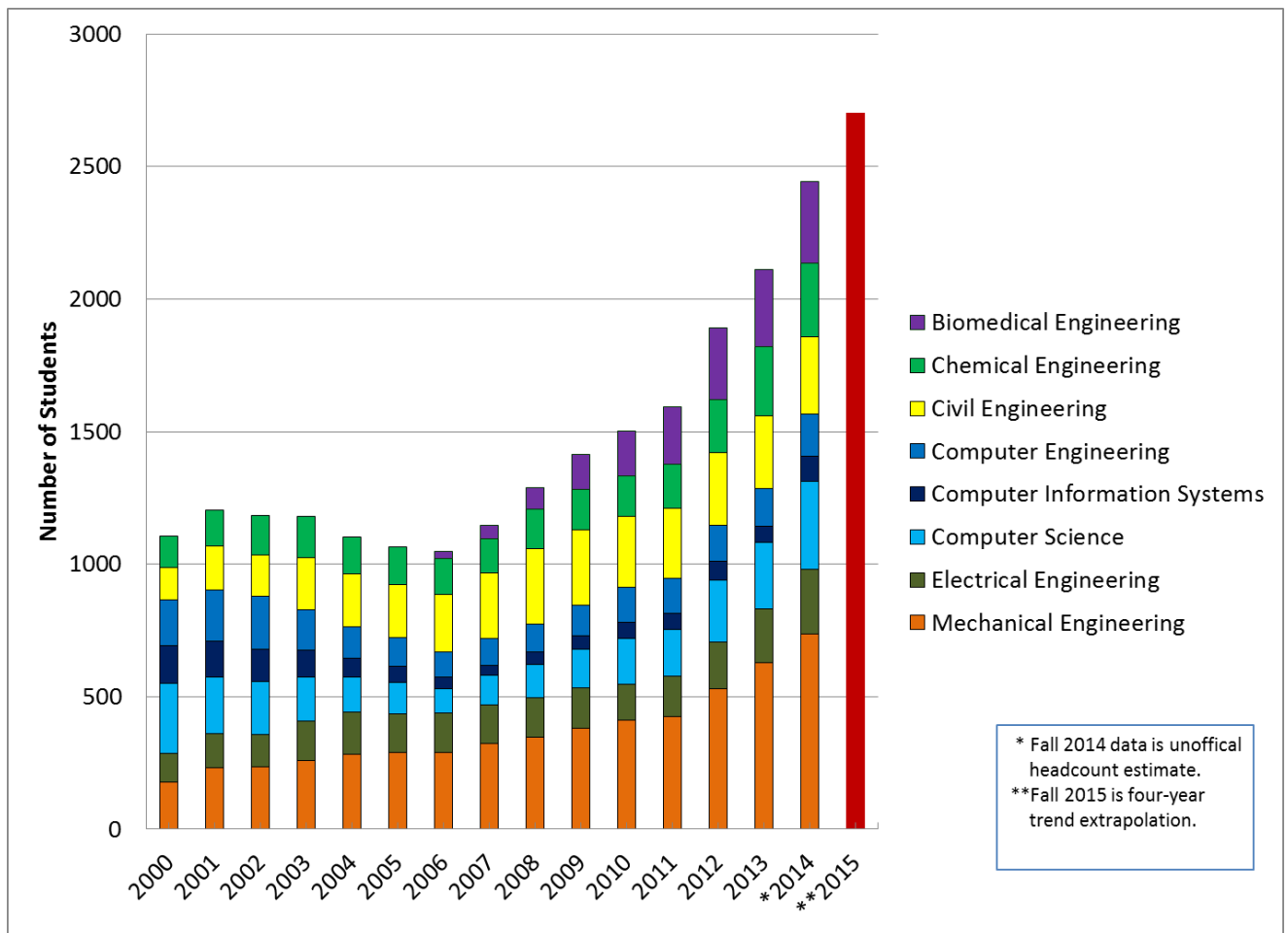

Figure 1.   Undergraduate enrollment has more than doubled in the College of Engineering and Computing since 2007. Enrollment has increased in all undergraduate degree programs in the College. Greatest increases have occurred in Biomedical Engineering, Computer Science, and Mechanical Engineering.

Impact Assessment Interviews

The CEC Department Chairs and Program Director were interviewed February 19-20, 2015 by the Associate Dean for Academic Affairs. Interviews lasted from 45 to 90 minutes. Interviews were semi-structured and addressed the following questions: How are you accommodating current enrollment? What problems are you experiencing? What problems do you anticipate? Each interview was concluded with a discussion of top concerns, risks and needs. Key findings are summarized below.

Biomedical Engineering

Total Fall 2014 undergraduate enrollment was 347, an increase of 500% since 2007. Impact includes:

- Have exceeded capacity of laboratory instructional space. Four classes with laboratory components are taught in one small laboratory space with experimental setups that can accommodate no more than 15 students per section.   Need 1000 sf more lab space. Adding biomaterials and cell culture laboratory equipment will be major expense.
- Laboratory manager who teaches and maintains laboratory components and also teaches one core course as well as two seminar courses, including the introduction to biomedical engineering. If she is required to teach more lab sections as a result of rising enrollments she will be unable to continue teaching these lecture classes.
- Continued support for current instructor from SOM will be needed when FRI hire is made and the MOU covering current use of FRI funds is terminated.
- Capstone design and build team projects are supported by industry and USC clients. Increasingly difficult to identify sponsors. Small budget for university-sponsored projects.
- Undergraduate classes have exceeded capacity of Swearingen and 300 Main regular classrooms. Large classrooms and theaters on campus are not configured for biomedical engineering pedagogy (large work desks for students and large, multiple chalk/white boards for instructor).
- Support for teaching assistants is needed to create recitation sessions and maintain quality of learning in large classes, and to provide instruction and supervision in laboratory sections.
- Eight tenure-track faculty size is too small to offer multiple sections of required courses or sufficient numbers of elective courses to accommodate student demand.

Chemical Engineering

Total Fall 2014 undergraduate enrollment was 276, an increase of 114% since 2007. Impact includes:

- Doubling of average class size from 30 to 60 students has been reasonably accommodated.
- Maintaining class size with continued growth could be accommodated by offering more required courses twice a year. Results would include increased teaching load, and difficulty in offering sufficient courses to meet demand for concentrations in materials and energy.
- Continued growth will necessitate additional sections of undergraduate instructional laboratory course each semester.
- Capstone design course is taught by retired faculty member. A Professor of Practice is needed to teach capstone design course and additional instructional laboratory sections.

- Computer labs are too small for current enrollment in (three) modeling/analysis courses.

Civil Engineering

Total Fall 2014 undergraduate enrollment was 293, an increase of 18% since 2007. Impact includes:

- Insufficient faculty to meet ABET curriculum breath requirements. Program is heavily reliant on Adjunct Faculty to meet these needs. Current adjunct budget supports 19 classes per year. Need to stabilize funds for adjuncts.
- Faculty teaching 3 courses per semester are at risk of burn-out.
- National employment projections indicate the highest demand for Civil Engineers among engineering majors.   Resources are needed for increased recruiting and retention efforts to meet demand for graduates.

Computer Science and Engineering

Since 2007, undergraduate enrollments in Computer Science, Computer Information Systems, and Computer Engineering have increased by 200%, 147% and 58%, respective.   Total Fall 2014 undergraduate enrollment was 586, an increase of 138% overall since 2007.

Impact includes:
- Enrollment growth had been accommodated by increasing class size. The first major course grew by 63% in Fall 2014 and the second course grew by over 60% in Spring 2015. This influx of new students will hit 211, 212 and 311 next year with corresponding increases.   Now at classroom seating capacity, more sections of required undergraduate courses are anticipated. Instructional staff (Teaching Assistants, Lecturers) will be needed.
- One instructor teaches most sections of the freshman computing course. Need to stabilize funds for this instructor, and to hire three additional instructors (1/yr) to accommodate enrollment increases as large freshman cohorts progress through curriculum.
- Priority for service courses (CSCE 101/102) is native English-speaking Teaching Assistants. Anticipate running out of qualified graduate students to serve as Teaching Assistants in both service and major-required courses.
- Current computer labs are insufficient to accommodate increased enrollment.   Need one or more new classrooms with sufficient networking and power connections, and to implement a student laptop requirement.

Electrical Engineering

Total Fall 2014 undergraduate enrollment was 244, an increase of 68% since 2007. Impact includes:

- Senior design facility is not sufficient for size of program or nature of projects. Need additional 800 sf with loading ramp or overhead door access.
- Industry-sponsored senior design projects becoming increasing faculty intensive.   Senior design currently taught by department chair.   A manpower investment is needed.

- Three instructional laboratory courses are taught in two laboratory rooms. Enrollment increases has been accommodated by alternating days in the lab. With further enrollment increases, multiple lab sections per day will be needed, but difficult to avoid other classes and will require night-time class hours. Additional laboratory space, instructors and TAs will be needed.
- A critical mass of faculty to cover the entire curriculum does not exist. Need to hire two faculty members per year to fill expected vacancies and grow faculty size to 20 in 2019.
- Need to understand administration expectations/priorities with respect to hiring full-time non-tenure-track instructors versus tenure-track faculty. Strategic planning is needed.

Mechanical Engineering

Total Fall 2014 undergraduate enrollment was 735, an increase of 127% since 2007. Impact includes:

- Undergraduate classes have exceeded capacity of Swearingen and 300 Main regular classrooms. Large classrooms and theaters on campus are not configured for mechanical engineering pedagogy (large work desks for students and large, multiple chalk/white boards for instructor).
- Support for teaching assistants is needed to create recitation sessions and maintain quality of learning with increased class size.
- At least three tenure-track faculty and two instructors are needed to fill vacant positions and reduce bottlenecks in laboratory and capstone design courses caused by enrollment increases.
- Capstone design and build team projects are supported by industry. Increasingly difficult to identify sponsors. No budget for university-sponsored projects.
- Machine shop is under-resourced to support student projects in capstone and freshman design.
- Not enough computers in computer labs to teach numerical methods courses.
- Expanding research activities have eliminated instructional laboratory space. About 2000 sf are needed for laboratory courses. About 1000 sf, with loading ramp and access to tools, are needed for senior design course.

Section III. Goals, Progress and Plans Relative to University's Key Performance Parameters

2015-2016 Academic Year Goals

I. One Year Goals

Goals	Key Performance Parameters (defined by Blueprint instructions)			
	Teaching Excellence	Research Scholarship Reputation & Productivity	Service to State, Community, Profession, & University	Sustainability of Mission: Fiscal, and through effective actions
I.1. Complete Horizon II Planning.	X	X		
I.2 First year advising program	X	X	X	X
I.3 Grow the distance learning Masters programs	X		X	X
I.4 Improve CEC Degree Offerings	X	X	X	X
I.5 Continue to Press for More Space/New Building	X	X		X

AY Goal 1: Complete Horizon II Planning

Performance Parameters: X____teaching X____research/scholarship ____service _____sustainability

I.1. In 2015, we will complete architectural planning of two floors in Horizon II. Currently we are planning for this space to provide three new classrooms on the first floor, as well as office and research lab space for the entire department of Computer Science and Engineering to occupy in Fall 2016. This will also free up existing space elsewhere in the college to be re-purposed for teaching, research, and student advising. We anticipate better teaching facilities, one larger classroom for large-enrollment sections, and better space for CSCE to enhance research activities.

AY Goal 2: Implement an Engineering and Computing First Year Advising Program

Performance Parameters: X____teaching X____research/scholarship __X__service X___sustainability

1.2. This goal contributes to teaching, research, service, and sustainability performance parameters. New students are currently advised by faculty in their declared degree programs.   However, 45% of CEC freshmen either change major or leave USC by their sophomore year. Advisement of first year students by professional staff advisors will improve retention through effective advisement and monitoring of undecided or at-risk students: retained students will generate additional tuition revenue for USC. It will reduce the cost to CEC of providing advisement by deploying staff instead of faculty. Time saved will also enable CEC faculty to concentrate more on teaching excellence and research productivity.

In support of AY Goal 2, two new professional staff advisors will be hired to report to the Associate Dean for Academic Affairs. These, combined with existing staff whose job duties will be modified, will enable this program to advise an expected 650 first-time freshman and 150 new transfer students during their first year at USC.

Goal 2: Implement an Engineering and Computing First Year Advising Program			
Type of Resource	Existing	Additional: state source	Strategy
Two First Year Advisors	$20,000	$108,000	Additional tuition resulting from improved retention will offset additional costs.

AY Goal 3: Grow the Distance Learning Masters Degrees

Performance Parameters: X____teaching X____research/scholarship ____service X____sustainability

1.i *How does the Goal contribute to the Performance Parameters* – Associate Dean Chaudhry directs the Executive Masters in Engineering Management. We now have one year of operating experience within CEC. We established the fee structure and course codes for our Executive Masters programs, so that we can receive the income for these programs. Two-way delivery has been established at the University Center in Greenville, and at the Low Country Graduate Center in Charleston. We have also used Bell South Funds to upgrade technology to two-way interactive delivery in Swearingen 1A20, so that we have improved the student experience. This should help us improve student satisfaction and recruit new students. This will also enhance our Masters degree enrollments and increase our interactions with industry and commerce in the state. We anticipate that this will also lead to research opportunities with sponsoring companies. The programs have been 'priced' to provide profitability to support other operations of the college.

1.ii *Describe plans for the upcoming year* – We have worked with Clemson, and also with The Citadel, in forming a collaboration whereby we explicitly allow students to take credit hour classes from anyone of the participating universities and incorporate them into the Masters degree requirements. Specific marketing for these programs has been created that is common to all participating universities. This has already been shared with Boeing SC and will be rolled out to the rest of the state shortly.

CEC participating programs include:

- Masters in Engineering Management
- Masters in Electrical Engineering (Power)
- Masters in Electrical Engineering (Communications)
- Graduate Certificate in Cyber Security Studies
- Graduate Certificate in Composite Materials and Structures
- Masters in Mechanical Engineering

- Masters in Aerospace Engineering
- Masters in Software Engineering

AY Goal 4: Improve CEC Degree Offerings

Performance Parameters: X____teaching X____research/scholarship ____service X____sustainability

2.i *How does the Goal contribute to the Performance Parameters* – We need to make better and more efficient use of our capabilities. We have a large number of courses available at both undergraduate and graduate level that we can utilize in different ways and create programs that would be attractive to students and industry. We also need to market our strengths in a better way. We are considering undergraduate and graduate degrees in energy, materials, and aerospace. If successful it will attract more students to want to study engineering and computing at 4 year college level and, hopefully convert these applications into more students turning up at USC CEC. We also have opportunity to enhance the BioMedical Engineering undergraduate degree with links to Law, Pharmacy, Nursing, Public Health.

2.ii *Describe progress, if the goal continues from previous years* – We have re-launched the Engineering Management and System Design masters degrees, and are creating new tracks/concentrations in the undergraduate areas whilst considering full and/or minor undergraduate degrees in Aerospace Engineering and in Energy Systems.

2.iii *Describe plans for the upcoming year* – Marketing of existing programs to Industry, and market surveys for potential new degrees.

AY Goal 5: Continue to Press for More Space/New Building
Performance Parameters: X____teaching X____research/scholarship ____service X____sustainability

2.i *How does the Goal contribute to the Performance Parameters* – More space will enable us to accommodate more students both at graduate level and undergraduate. We will be able to accommodate larger equipment becoming more prevalent in much research, and accommodate our larger faculty numbers. Larger classrooms are needed so as to limit the numbers of multiple sections of classes. Applied Computing degree is slated to attract even more students than currently and will need more classroom and lab space. Some CEC space is seriously deficient.

2.ii *Describe progress, if the goal continues from previous years* – Working with university on various options – Horizon II, BioMass Plant. Looking at financial options for totally new building. Have received a promise of $1M towards the building. Planning for new space in Horizon II.

2.iii *Describe plans for the upcoming year* – Confirm plans for Horizon II upfit – once complete, then planning for utilization of released space in Swearingen needs consideration. It is inevitable that funds for remodeling/refurbishment of the Swearingen space will be required. One initial consideration is to provide much needed facilities for the Biomedical Engineering program.

5-Year Academic Year Goals

5Y Goal 1: Student Recruitment and Retention
Performance Parameters: X____teaching _____research/scholarship ____service X____sustainability

1.i *How does the Goal contribute to the Performance Parameters* – The College has the opportunity to grow its student numbers (undergraduate recruitment); in common with many engineering and computing programs we have a relatively low retention rate for admitted students. Recruitment is being addressed through increased and better marketing, PLTW, Edison Lecture Series, better use of existing scholarships, and creation of more 'interesting' programs. We need to be more pre-emptive with spotting 'at-risk' students and supporting them to get back on track; we can analyze freshman applicant pool and historical data to predict needs in introductory courses – we already know that performance in freshman math classes is an indicator of future performance and dropout...we should consider placing some freshmen in MATH 115 instead of other classes...possible impact on sequencing of other classes. As we start to focus of recruiting from the Pee Dee this will become increasingly important. Need more scholarships.

1.ii *Describe progress, if the goal continues from previous years* – Marketing and outreach appear to have had 'some' impact with increasing numbers of applications and enrollments. Better connections with USC component institutions is having an impact for transfer students – links to other state technical colleges in hand.

1.iii *Describe plans for the upcoming year* – begin data analysis of student performance as a measure of future problems. Look at implications of admitting students with certain backgrounds and possible implications for a 'starter' semester or year to bring up to speed. Continue development and marketing of new programs. Search for more scholarships.

5Y Goal 2: Collaboration Across Campus and other Universities/Colleges
Performance Parameters: X____teaching X____research/scholarship ____service X____sustainability

2.i *How does the Goal contribute to the Performance Parameters* – Through better utilization and exploitation of capabilities across campus for both teaching and research e.g. Engineering Management, Human Factors, System Design, Energy Leadership Institute.

2.ii *Describe progress, if the goal continues from previous years* – The creation of the Engineering Management program has been successful in bringing teaching material from across 4 colleges; Energy has 6 colleges and has already led to cross university large research proposals, including working with other universities – our subsequent perceived strength has enabled us to take on the role as PI which may not have been the case otherwise.

2.iii *Describe plans for the upcoming year* – as above.

5Y Goal 3: Formalization of Biomedical Engineering Program
Performance Parameters: X____teaching X____research/scholarship __X__service X___sustainability

2.i *How does the Goal contribute to the Performance Parameters* – The Biomedical Engineering program has been the 2nd largest undergraduate program, and it has achieved this after only 8 years of operation. It's faculty are spread over two colleges (CEC and the Medical School) and, within CEC, in two departments. There is no equality of the expectations between each group of faculty (tenure requirements, teaching load etc.) – this is causing problems and uncertainty amongst the faculty so this needs to be addressed.

In the short term, and as suggested by Christine Curtis, a single cross-department tenure process for affiliated biomedical engineering faculty is being created. Serious consideration needs to be given to create a Department of Biomedical Engineering.

Appendix A: Resources Needed (one page)

Goal 1: Complete Horizon II planning			
Type of Resource	Existing	Additional: state source	Strategy
Renovation funds		$1,500,000	Funds are needed to renovate the vacated space in Swearingen for teaching and research.
Goal 2: Implement an Engineering and Computing First Year Advising Program			
Type of Resource	Existing	Additional: state source	Strategy
Two First Year advisors	$20,000	$108,000	Additional tuition & fees resulting from improved retention will offset additional costs.
Goal 3:			
Type of Resource	Existing	Additional: state source	Strategy
Goal 4:			
Type of Resource	Existing	Additional: state source	Strategy

Appendix B: Benchmarking information

Top 10 Public Colleges of Engineering

Cal-Berkeley; Illinois; Texas; Minnesota; U. Washington; Georgia Tech; Purdue; Michigan; UCLA; UC-San Diego.

Top five peer departments for CEC Departments and Programs

CSCE	ECHE	ECIV	ELCT	EMCH
Rutgers	Florida	Florida	NC State	Kentucky
Georgia	U Mass	Alabama	Clemson	Connecticut
Connecticut	Ohio State	Iowa State	UNC-Charlotte	Central Florida
Kentucky	Oklahoma	Auburn	Arkansas	NC State
Clemson	Washington	Kentucky	Nebraska	Tennessee

Appendix C. Unit's Top Strengths and Important Accomplishments (Individual Department Data in Appendix)

1. Increasing numbers of large collaborative research projects being submitted (Aerospace, Energy, Materials)
2. Achieved formal collaboration with Boeing SC for research projects (McNair)
3. Undergraduate enrollments continue to increase, but…see below
4. Cross State collaboration on part-time and executive education programs – SC-Smart. In association with Clemson, The Citadel and, eventually, the College of Charleston

Appendix D: Unit's Weaknesses and Plans for Addressing Weaknesses (Individual Department Data in Appendix)

1. 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. Some departments already have the requirement for all graduate students to give 5 hours per week in TA/Grader work. Funds are sought for further graduate student support. The College has expanded on the use of peer tutoring, i.e. undergraduates who have already taken key/core classes will help those that are taking that course.
2. 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…and is now critical! As discussed above, the allocation of two floors in Horizon II may help alleviate some of the space concerns in the college, but this will not be ready until Fall 2016 at the earliest. The additional concerns about space have been cited above.
3. Biomedical Engineering undergraduate degree needs more and better facilities – more faculty and research leadership.

Appendix E: Unit Statistical Profile

2014 Blueprint Appendix E.1 Freshman class size and average SAT scores						
Freshman Profile	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Freshmen Class Size	392	431	485	494	618	627
Average SAT	1237	1217	1226	1226	1254	1242

2014 Blueprint Appendix E.2 Freshman-Sophomore retention rate						
Fresh-Soph Retention Rates	Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013
in the College	71.1%	69.2%	69.4%	65.6%	72.1%	
at USC	82.3%	86.3%	84.0%	79.9%	84.8%	

2014 Blueprint Appendix E.4 Number of Majors Enrolled (Fall semester count)						
Year	2009	2010	2011	2012	2013	Fall 2014
TT Fac Count	94	102	106	114	111	107
UG enrollment, FT	1584	1698	1849	1971	2188	2324
Masters	164	195	192	164	178	
Doctoral	289	328	343	370	338	
FT Grad enroll	283	325	327	322	350	348
PT Grad Enroll	90	103	122	125	166	151
UG Stu/TT Fac	16.9	16.6	17.4	17.3	18.3	21.7
Total FT stu/TT Fac	19.9	19.8	20.5	20.1	21.4	26.4

2014 Blueprint Appendix E.5 Number of entering first professional and graduate studies students (Note: Nuclear and Biomedical Engineering students counted separately from Chemical and Mechanical students.								
	CHE	**CEE**	**CSE**	**EE**	**ME**	**NE**	**AE**	**BME**
Applications M+D	130	57	127	92	68	11	5	27
Acceptances M+D	20	39	77	19	12	6	3	12
Enrolled M+D	13	7	28	15	12	6	3	9
UG GPA – Masters			3.82	3.4	3.43	3.05	3.42	3.49
number of applicants			6	5	7	5	3	5
UG GPA - Doctoral	3.6	3.36	3.28	3.21	3.64	3.13		3.36
number of applicants	11	4	2	7	5	1		4
Verbal GRE - M			154.4	154	150	151	157	147.4
Verbal GRE - D	155	145	150	144	149			160
Quant GRE - M			160	155	154	158	160	154
Quant GRE - D	161	161	162.2	161	160			157
Anal Writing GRE - M			3.81	3.8	3.29	3.5	4.33	3.8
Anal Writing GRE - D	3.6	2.5	3.3	3.1	3.4			4.25

2015 Blueprint Appendix E.7. Degree Productivity					
AY	**2009-2010**	**2010-2011**	**2011-2012**	**2012-2013**	**2013-2014**
Baccalaureate	227	292	289	315	295
Masters	56	88	78	62	74
Doctorate	33	29	40	49	67
Certificates	0	1	1	0	0

2015 Blueprint Appendix E. 7. 6-Year Graduation Rates					
Six-Year Graduation Rate	**Fall 2004**	**Fall 2005**	**Fall 2006**	**Fall 2007**	**Fall 2008**
from the College	35.6%	41.1%	45.3%	49.5%	
from USC	58.6%	61.5%	64.2%	66.2%	

2015 Blueprint Appendix E.8. Total Credit Hours Generated								
	Fall 2011	**Fall 2012**	**Spring 2013**	**Sum 2013**	**Fall 2013**	**Spring 2014**	**Sum 2014**	**Fall 2014**
Undergraduate	12,475	16,229	15,842	684	16,555	17,226	1,046	20,148
Masters	1,038	899	968	185	999	983	178	1,383
Doctoral	1,872	1,721	1,647	451	1,446	1,529	331	2,010
Total	15,385	18,849	18,457	1,320	19,000	19,738	1,555	23,541

2014 Blueprint Appendices E.9 and E. 10 . Percentage of UG Credit Hours Taught by faculty with a PhD (Highest terminal degree). Fall 2013 Semester					
Program	**Total UG Cr Hours**	**UG Hrs Taught by Faculty with PhD**	**Percentage taught by PhD**	**UG Hrs Taught by FT CEC**	**Percentage taught by FT CEC**
BMEN	1010	884	87.5%	734	72.7%
CSCE	5875	2365	40.3%	2365	40.3%
ECHE	1465	1449	98.9%	1311	89.5%
ECIV	2096	1859	88.7%	1532	73.1%
ELCT	1683	1656	98.4%	1656	98.4%
EMCH	4007	3518	87.8%	2312	57.7%
ENCP	678	678	100.0%	678	100.0%

Note for Appendices E.9 and E.10: All Assistant, Associate, and Full Professors, as well as Clinical and Adjunct faculty, hold the Ph.D. FT CEC faculty excluded adjunct faculty who may hold full-time appointments in other USC Colleges (particularly, the School of Medicine).

2015 Blueprint Appendix E.11 Faculty count by rank and department						
Source: ASEE On-line tables						
		Full	Assoc	Assist	FT Instr	PT Instr
Chemical	2010	12	4	4	0	1
	2011	12	4	6	0	1
	2012	13	4	7	2	0
	2013	12	4	7	0	2
	2014	9	5	6	0	2
Civil	2010	3	10	6	0	3
	2011	3	9	7	0	3
	2012	3	9	8	0	4
	2013	4	8	6	4	4
	2014	4	8	8	0	4
Computer	2010	5	11	5	1	2
	2011	4	12	5	1	2
	2012	5	12	6	0	0
	2013	6	13	3	1	3
	2014	10	9	2	0	3
Electrical	2010	4	8	3	1	1
	2011	6	8	2	1	1
	2012	6	7	4	1	0
	2013	7	6	4	0	0
	2014	6	5	5	0	0
Mechanical	2010	11	5	11	0	5
	2011	11	7	10	0	3
	2012	12	7	11	0	4
	2013	13	7	10	3	4
	2014	14	6	10	0	4

FY 2014 VPR Award Summary	Total funded	Total Awards	TT Faculty	$/TT Fac
Engineering & Computing, College of	80	$ 25,361,869.00		
Chemical Engineering		$ 11,074,639	20	$553,732
Civil & Environmental Engineering		$ 583,200	20	$29,160
Computer Science & Engineering		$ 396,632	21	$18,887
Electrical Engineering		$ 3,586,874	16	$224,179
Engineering & Computing, College of		$ 150,400		
Mechanical Engineering		$ 9,570,124	30	$319,004

Data on submissions is not yet available at the VPR Web site.

Appendix F – CEC Building Needs (Overview/Summary)

**See Attached (and separate) PowerPoint File
(completed in 2013)**

CEC Space Status

College of Engineering and Computing

April 9, 2013

Bob Mullen, Mike Matthews

Outline:

Historical review of College space and size

Current conditions

Benchmarking space of CEC with other universities
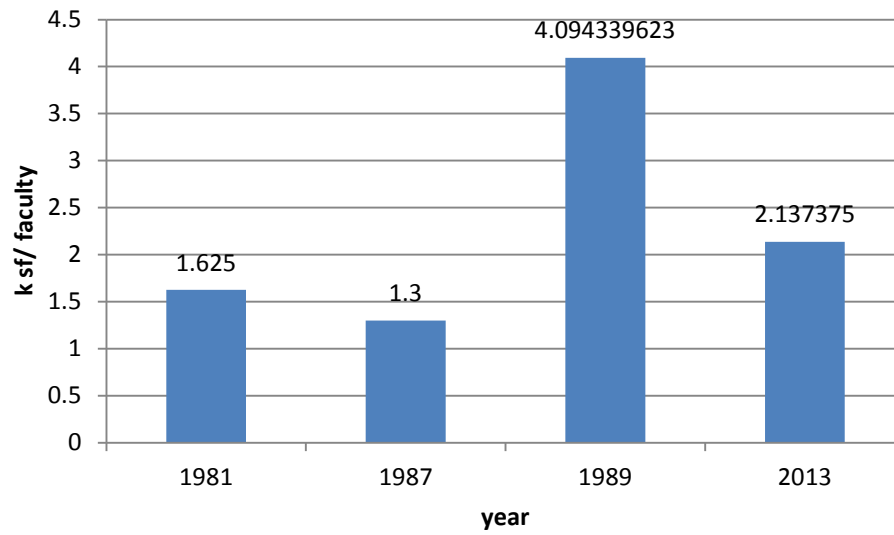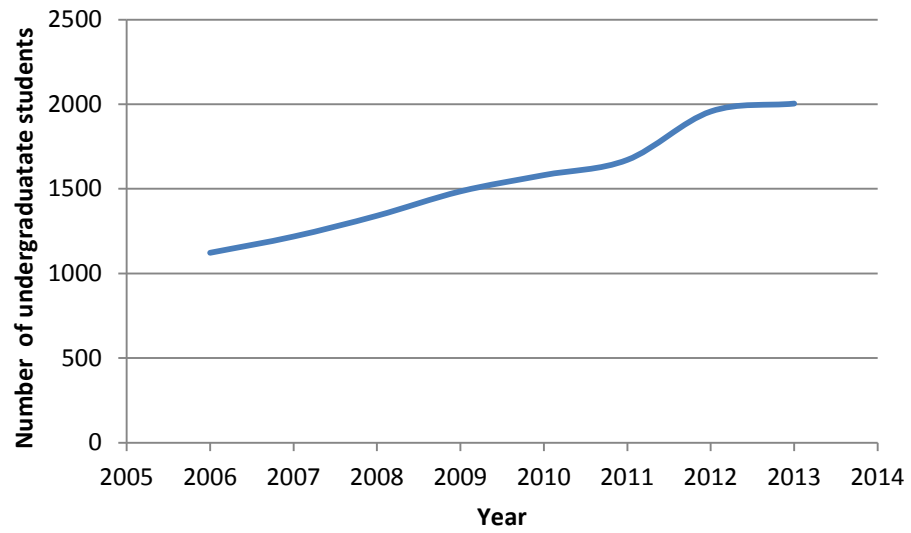
Possible locations for growth

Discussion

1955- 1959	Sumwalt Building	66,500	sf. Net
1987	Swearingen Building	161,000	sf. Net
1989	300 Main	70,000	sf. Net
Current	Added Catawba, 3 floors in Horizon	256,458	sf. Net
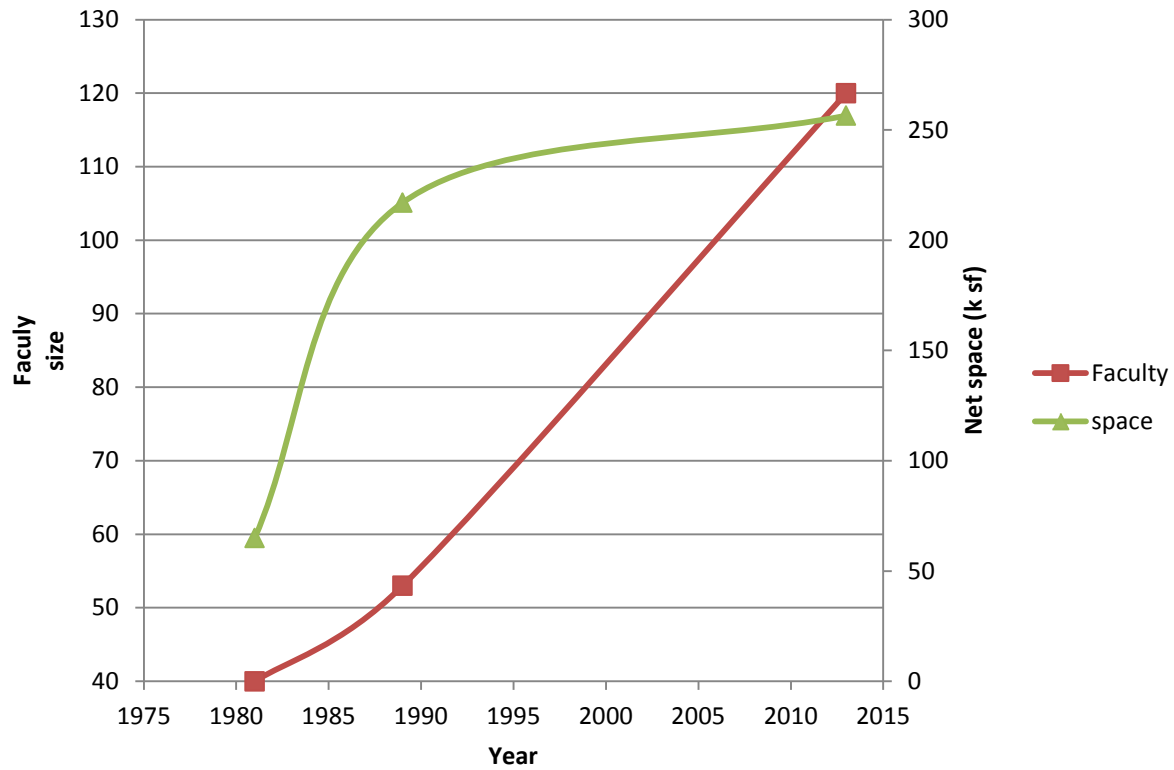
Outline:

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Possible locations for growth

Discussion

Department	Department Code	Space	Percent
CEC	15500	52105	20.4
CE	15510	61807	24.2
CEE	15520	43919	17.2
EE	15530	47342	18.5
ME	15540	31281	12.2
CSE	15590	15001	5.9
USC	10120	3373	1.3
USC	50030	124	0.0
USC	62200	508	0.2

Usage	CEC	CE	CEE	EE	ME	CSE
OFFICE	5904	6650	9953	10773	12879	7629
CENTRAL STORAGE	6405	1618	0	674	277	958
RESEARCH LABORATORY	90	49993	19365	19573	10378	5229
CLASS LABORATORY	4845	1469	7785	6398	5425	816
OFFICE SERVICE	5503	265	785	1033	936	369
CONFERENCE ROOM	2603	678	777	3265	559	0
CONFERENCE ROOM SERVICE	370	21	0	0	0	0
CLASSROOM	17825	0	0	0	0	0
CLASSROOM SERVICE	830	0	0	0	0	0
CENTRAL COMPUTER/TELECOMM	1434	0	179	164	0	0
CENTRAL COMPTR/TELECM SER	47	0	0	160	0	0
STUDY ROOM	2238	0	0	1073	0	0
RESEARCH LABORATORY SERV	0	1113	933	3362	360	0
MEDIA PRODUCTION SERVICE	0	0	0	0	0	0
MEDIA PRODUCTION	0	0	0	0	0	0
MEETING ROOM	923	0	0	0	0	0
CLASS LABORATORY SERVICE	485	0	3777	336	0	0
INACTIVE AREA	2427	0	0	0	0	0
STACK	0	0	0	128	0	0
LOUNGE	0	0	365	0	467	0
SHOP	0	0	0	403	0	0
Total	52105	61807	43919	47342	31281	15001

| Department	TT Faculty Count, Spr. '13	Current Space (s.f.)	Space per Faculty
CEC Dean	0	52,105	
Chemical	24	61,807	2,575
Civil & Env.	20	43,919	2,196
Electrical	17	47,342	2,785
Mechanical	32	31,281	988
CSCE	24	15,001	625

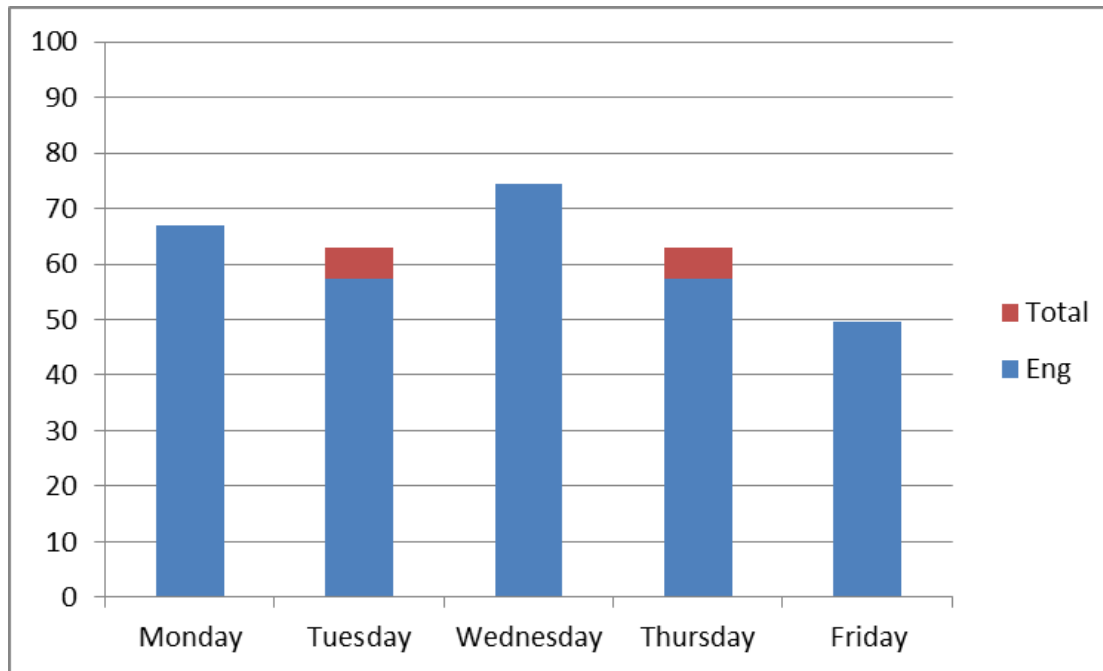# The College of Engineering and Computing has allocated 17,825 sf. of lecture space in 18 rooms

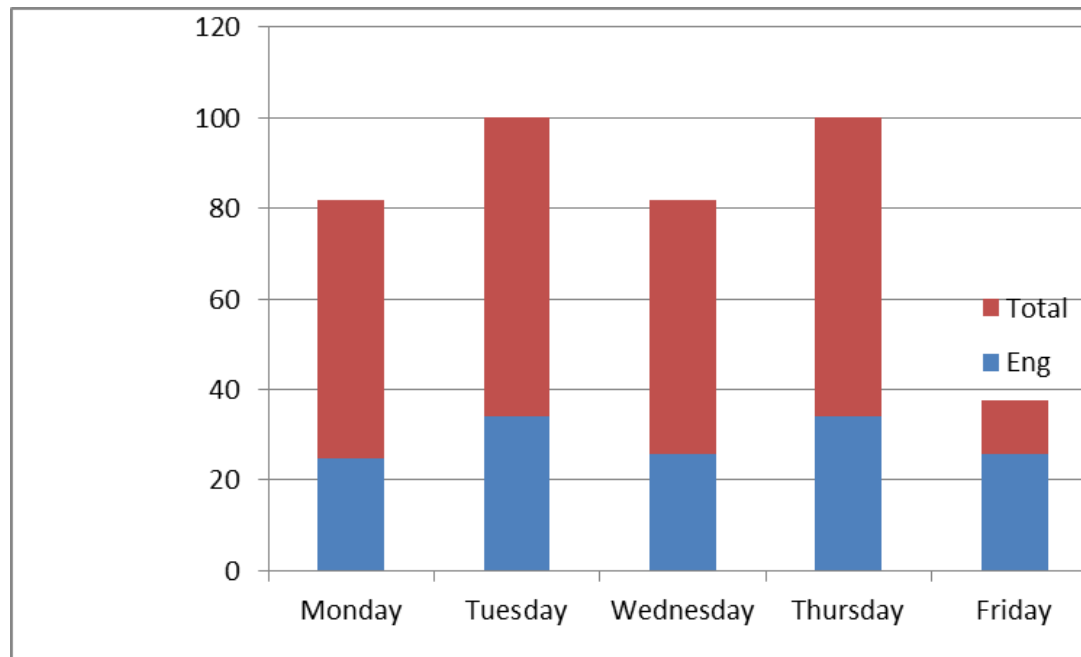| Lecture Room Capacity	Number of Lecture Rooms (18 total)
320 (Amoco)	1
66-70	3
42-55	4
1-35	10

Classroom utilization (%) for all rooms assigned to CEC
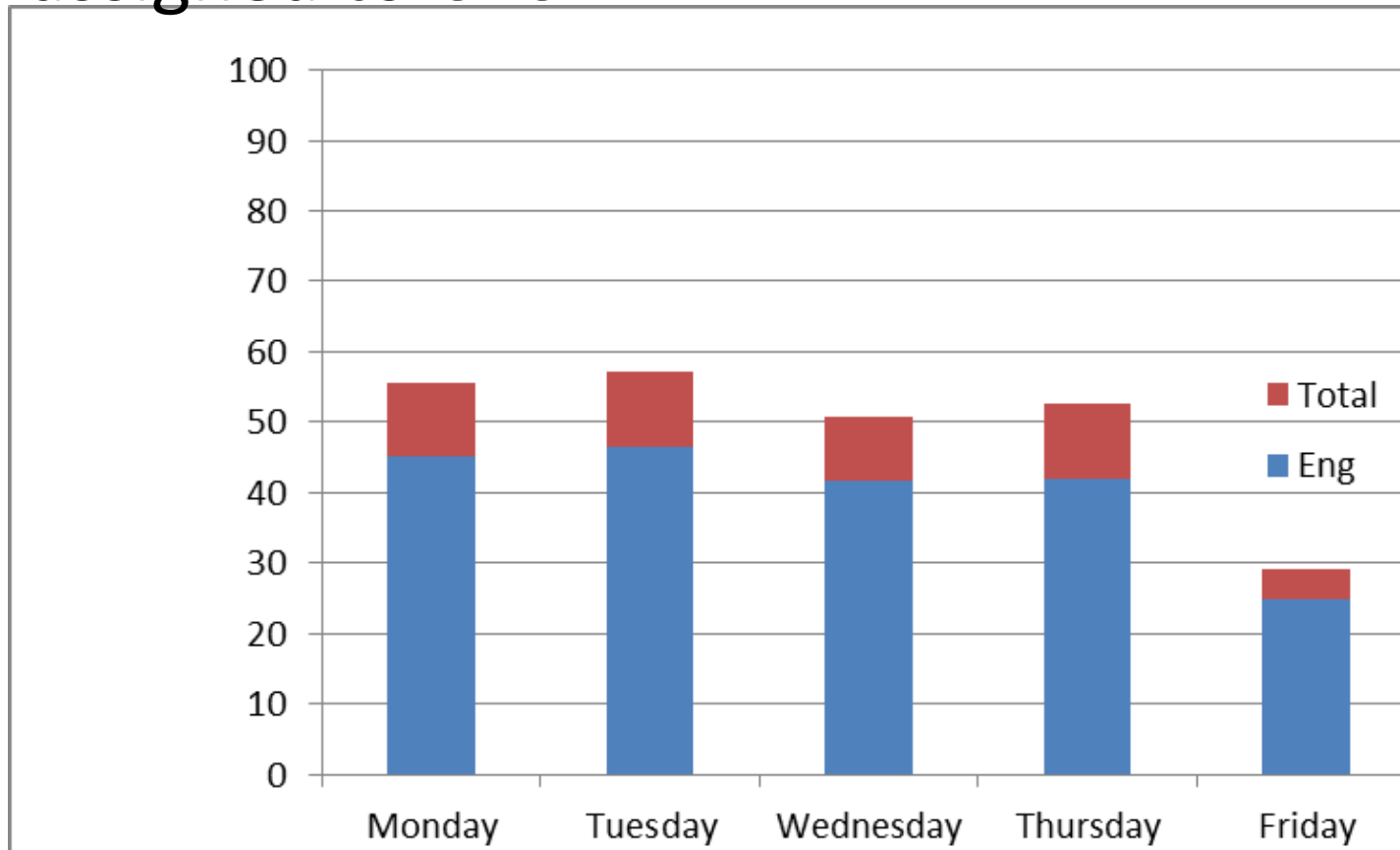
Classroom utilization (%) for rooms with 60-70 student capacity

Classroom utilization (%) for AMOCO rooms with 60-70 student capacity

Computer Science and Engineering:

- Larger classrooms for large enrollment classes, especially service courses.
- At least 5,000 sq. feet, and ideally 15,000 sq. feet increase in lab space, to bring CSCE in line with peer departments, as recommended by the Computing Research Association. In some cases, 3 PIs are sharing rooms. Utilities, in particular cooling, must be adequate for equipment.
- 5 PhD students, fully supported, did not have a desk. (10/23/2012)
- New hire G.Q. Zhang did not have an office as of 10/23/2012.
- An anticipated hire in Fall 2013 will need an office.

Civil & Environmental Engineering:

- Seating and offices for graduate students and post-doctoral researchers. Expect 12 new Ph.D. students this summer with no desk space.
- Addition space for hydraulics lab

Chemical Engineering:

- Seating and offices for graduate students that is not inside chemical labs
- Additional space, or renovated space, that would allow all labs to be compliant with current NFPA codes.

Electrical Engineering:

- 3,000 sq. feet immediately for one senior and two junior hires, Fall 2012.
- Certain faculty slotted to retire do not have labs. New hires would need lab space that the department does not presently have. (10/2012)
- 2,,000 sq. feet immediately for senior design and robotics labs. Each course in the two-semester sequence is now taught every semester.

Mechanical Engineering:

- Two of the recently hired faculty (Drs. Farouk and Tarbutton) **do not have any research laboratory**. Both of these faculty members have obtained external funding. 3000 sq. feet needed immediately for them to succeed at USC.

- Two of the recently hired faculty (Dr. Yang and Dr. Banerjee) have inadequate and sub-standard laboratory space in the basement of A-wing. Immediately need 1,000 square feet each? for them. Dr. Yang has NSF and EPSCoR funding, we have the potential to lose him if we do not help him with the laboratory space.

- McNair Chair, Prof. Zafer Gurdal does not have an office space nor does he have laboratory space. Some space in Horizon I is slated for McNair Center (will not be ready before summer 2014!!), the allotted space will meet about 40-50% of his need. At least 10,000 square feet is immediately needed.

- The department is currently going through a senior faculty search for the McNair Center. 3,500 sq. feet of laboratory and office space (for post doc and graduate student) will be needed starting August 2013.

- # Mechanical Engineering: (Cont)
- A senior professor (Smart State Center Chair) and a junior faculty in Nuclear Engineering will be hired by August 2013. Space slated for Nuclear Engineering in Horizon I will not be ready before Summer of 2014, and the allotted space is not sufficient for them.
- 2,000 sq. feet immediately for senior design (EMCH 427 and EMCH 428) and ME Systems Laboratory (EMCH 363) courses
- No office space for Post-Docs and or visiting faculty. Need at least 1500 square feet of office space.
- About 8 of the departmental PhD students do not have any office space.
- No meeting space for seminars and meetings; the departmental conference room is not large enough to sit all 31 departmental faculty during faculty meetings.

Outline:

Historical review of College space and size

Current conditions

Benchmarking space of CEC with other universities
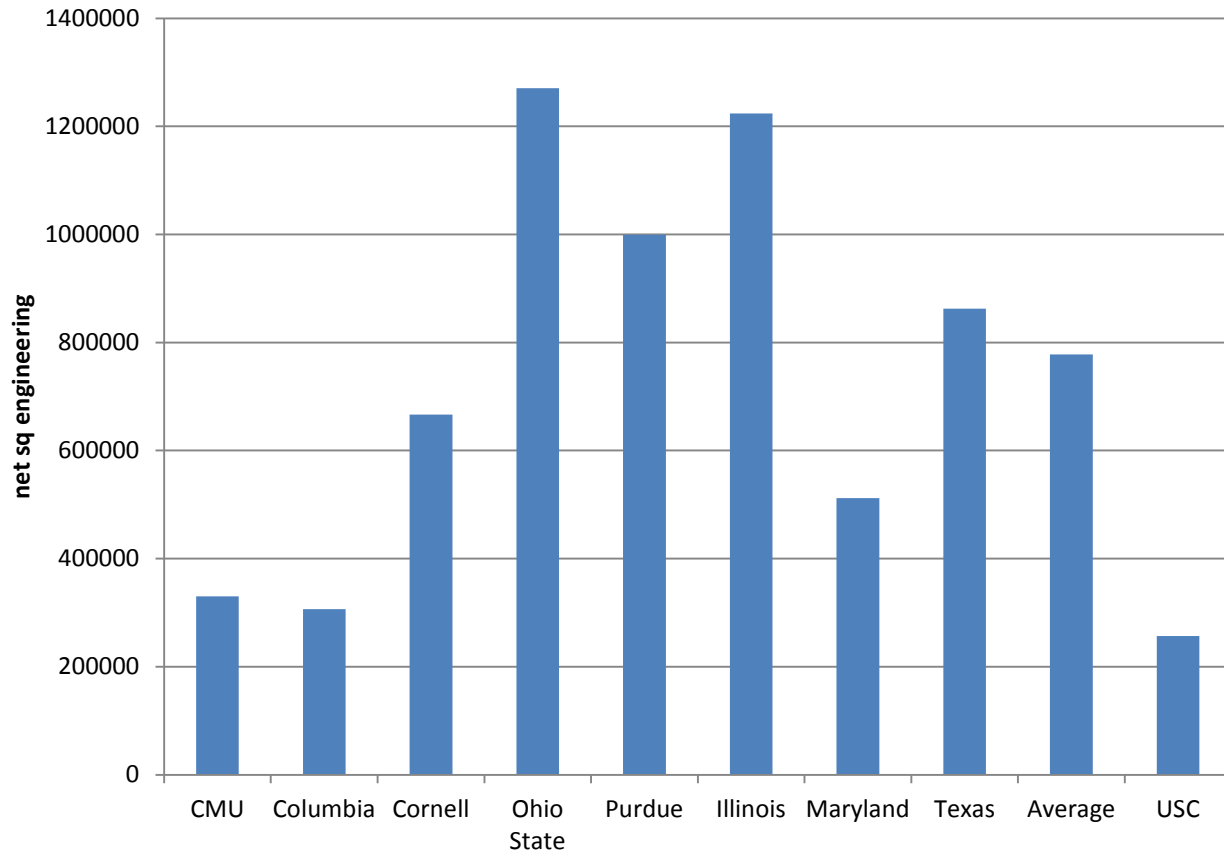
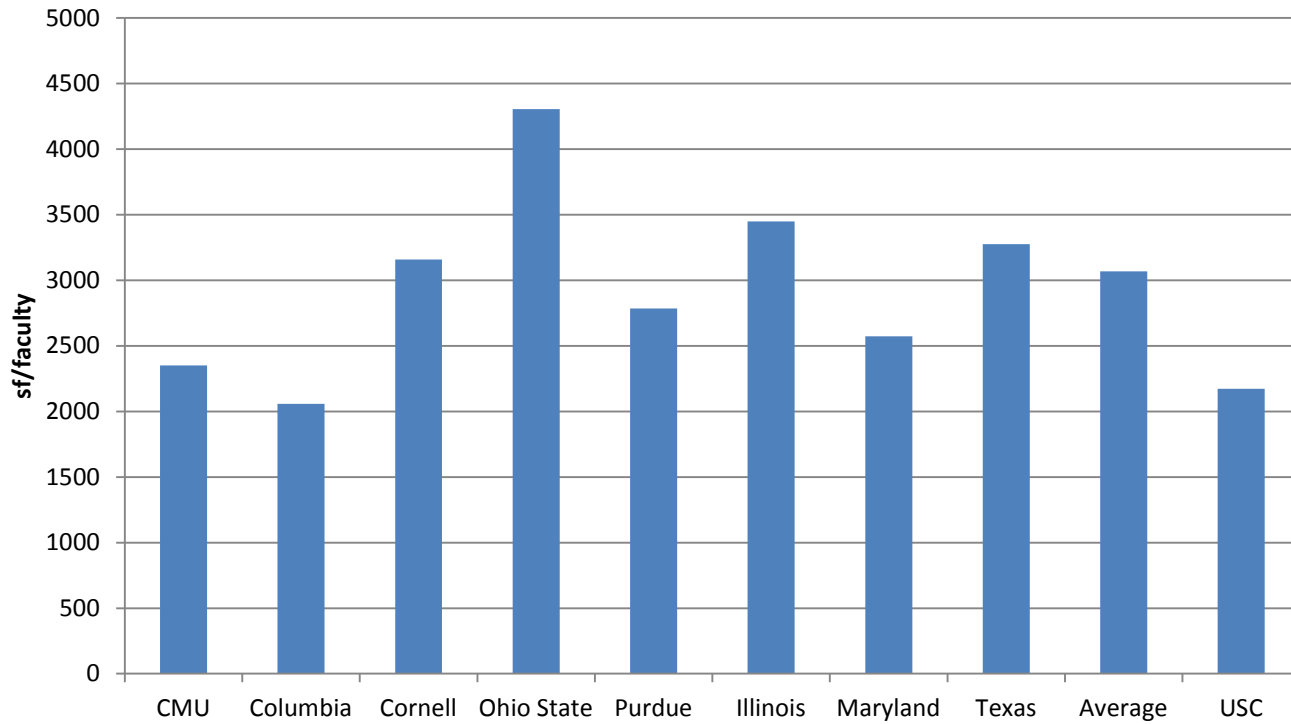Possible locations for growth

Discussion

Ballinger 2011 report on space usage prepared for University of Texas

Data from (CMU, Columbia, Cornell, Ohio State, Purdue, Illinois, Maryland and Texas).

Texas A M 2002 University Space Planning report by Paulien and Associates

Existing value at Look College of Engineering
3.9 k sf/ faculty

Using Paulien's comparative data base
the guideline number for Texas AM using
a no growth model
   1,739 k sf / 282 faculty = or 6.1 k sf/ faculty

Benchmark data indicates that
CEC CURRENTLY needs
from 60,000 to 450,000 sq. ft.

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Discussion

Vision, Opportunities

Condition Based Maintenance program. This program is currently supported at about $1.5M per year. It occupies about 3,200 square feet in 1223 Catawba Street and about 350 square feet in the basement of A-Wing in the 300 Main Building used as storage and staging space. This program literally loses about $500,000 per year due to lack of space. Expansion to about 7,000-8,000 square feet would allow additional projects and increased funding. Consolidating the CBM in one space would also clear the 350 square feet in 300 Main for the Department of Mechanical Engineering.

Several additional research/teaching laboratories are needed across departments. Need a core area for Biomedical Engineering

Vision, Opportunities

There is also a strong desire to create specialized instructional space to support interdisciplinary design groups. In addition to instruction, having such facilities clustered in an accessible area would enhance undergraduate recruiting and help attract companies to support design projects. This will also enhance/encourage the capstone experience across different majors with Engineering and Computing through common projects and multi-functional teams. Capstone and multi-functional team experience is a big plus for industry new hires nowadays.

Shared design studio (AE, BME, ChE, CEE, CSCE, EE, and ME)

Open design/showcase workstation area (all CEC majors)

Vision, Opportunities

The new building will also provide the opportunity to cluster approximately 5,000 square feet to cluster the various student professional chapters and organizations. A purposeful design will include meeting areas, group study rooms, and secure locations to maintain records. This should have a positive effect on retention.

Vision, Opportunities

The new building will allow the college to improve the Office of Academic Services and its outreach, recruiting and retention programs. Several offices are too crowded, or are tucked away behind counters and other offices, making it difficult to accommodate visitors. The college is renting space to store their posters, flyers, and instructional materials for outreach programs such as PLTW. The new building will also provide a location for satellite office of the Student Success Center, to provide tutoring and supplemental instruction for students. This activity would be managed by Academic Services. Approximately 4,000 square feet are needed.

Vision, Opportunities

The present distance education (APOGEE) rooms are small, seating 30 or fewer. Thus even an average-size or large enrollment course cannot be selected for distance education unless overflow enrollment is put in a secondary room. In the new building, rooms of various, but larger seating should be specially designated for distance education. In addition to regular classes, these rooms could be utilized for short courses and other presentation for delivery to practicing personnel. These special rooms would support: Distance education/distributed learning facilities. For Palmetto College and for Engineering Management. Also, to support the campus-wide Digital Design minor.

Horizon I Building	Build-out of the 5th floor	17,500
	Build-out of ground floor	16,500
Horizon Parking Structure	Build-out basement	5,000
Horizon II building	2-3 floors to CEC	35,000
New Building behind 300 main	2 floors	74,500

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Discussion

The College of Engineering and Computing needs 90,339 sq. ft. now.

The College of Engineering and Computing needs to plan for additional space 5-10 years out to match our growth plans.