

# 2012-2018 STRATEGIC PLAN FOR THE VIRGINIA TECH COLLEGE OF ENGINEERING

## Introduction

Virginia Tech's College of Engineering is one of the finest in the world. This is evidenced by the great demand for admission to the college's undergraduate and graduate programs, the great demand to hire the college's graduates or to admit them to graduate school, and the great demand to participate in the college's research.

The excellent reputation of the College of Engineering arises from a "hands on, minds on" philosophy towards engineering education and practice that dates back many decades, and which gives it distinction among other great engineering colleges. The faculty and staff of the College of Engineering are committed to:

- Active-learning by our students in highly regarded engineering programs;
- Educational trailblazing and the early adoption of new learning technologies;
- High quality research which, in the Land Grant tradition, is timely and focused on problems of great importance to society; and
- An *Ut Prosim* spirit of generous service.

Looking ahead six years, the College of Engineering will sustain its excellence and distinctiveness by following a strategic plan that is built upon five themes.

Theme 1: Provide a high quality environment for teaching, learning and research.

Theme 2: Recruit, educate and graduate a high quality and diverse undergraduate student body.

Theme 3: Recruit, educate and graduate a high quality and diverse graduate student body.

Theme 4: Address problems of regional, national and global importance.

Theme 5: Support a diverse community of faculty, staff and students.

Sets of emphases and measures are presented for each theme of this strategic plan.<sup>1</sup>

---

<sup>1</sup> Virginia Tech metrics are taken from the 2010-2011 academic year. When comparisons are made to other engineering colleges the data is from the 2009-2010 academic year as that was, in spring 2012, the most recent information available from the American Society of Engineering Education through its publication, *Profiles of Engineering and Engineering Technology Colleges*. In the case of research spending per faculty member, comparisons are made to 2009-2010 data published by *U.S. News and World Report* in its ranking of graduate engineering programs in March 2011. Diversity is emphasized in all five themes, with the diversity measures being presented in the fifth theme.

## Context for the strategic plan

In 2005 Virginia's Restructured Higher Education Financial and Administrative Operations Act gave the state's public colleges and universities greater operational autonomy in return for their commitment to meet state higher education policy goals and performance measures. The act required all institutions to develop six-year academic, financial and enrollment plans to meet the state's goals. To comply with this act, Virginia Tech prepared a strategic plan for 2006-2012. A selective mid-term review was completed in December 2009. To align with this schedule, the College of Engineering also prepared a strategic plan for 2006-2012 and participated in the mid-term review in 2009.

In March 2011 President Charles Steger charged a presidential task force to develop a "Plan for a New Horizon" for Virginia Tech for 2012-2018. With guidance from the new university strategic plan, the College of Engineering prepared its strategic plan for 2012-2018.<sup>2</sup>

Also providing context to this plan is our commitment to offering accredited degrees that, as appropriate, are validated by ABET Inc.<sup>3</sup> and the Southern Association of Colleges and Schools.

For the five themes of the engineering strategic plan, we describe specific areas of emphasis and provide measures that will allow us to track our progress. The usual caution should be issued here; not everything that is important is readily measured. We note too that an effort has been made to set targets that we may realistically hope to achieve by 2018, *but not easily so*.

Additionally, we note that the measures are reflections of success but not, in and of themselves, our goals. For example, we cannot directly guarantee that the average faculty member will conduct \$600,000 in research spending, that 68% of the graduating B.S. class will have co-op and internship experience, or that the faculty will have 50 female members.<sup>4</sup> We can, however, work towards an environment that results in such achievements by the year 2018.

Collectively, we accept the challenge to significantly advance the Virginia Tech College of Engineering in *all* areas of our endeavor. In doing so, we will continue to enjoy the reputation as one of the world's great resources for engineering knowledge and superbly trained engineering graduates.

## Achievements from the last strategic planning period

As we plan ahead six years to 2018 it is worth taking a look back at the progress made by the College of Engineering between 2006 and 2012. Highlights include the following:

- From fall 2005 to the present, 116 new engineering faculty members were hired, increasing the total faculty size from 299 to 316.<sup>5</sup> Put another way, over a third of the

---

<sup>2</sup> The College of Engineering's strategic plan is mapped to the Virginia Tech strategic plan in the appendix.

<sup>3</sup> ABET Inc. was formerly known as the Accreditation Board for Engineering and Technology.

<sup>4</sup> These are three of the measures stated in the strategic plan.

<sup>5</sup> In reports to ASEE we often count the faculty members of the Department of Biological Systems Engineering (BSE) in order to better describe data such as student-to-teacher ratios. If we add the BSE faculty numbers, the overall engineering faculty size was 317 in 2006 and 331 in 2011.

engineering faculty was hired after 2005. Of the new hires, 21 were women and 10 were from under-represented minority groups.

- Before 2008 no engineering department at Virginia Tech had ever been headed by a woman or an African-American. By 2011 there were three women heading engineering departments.<sup>6</sup> One of them was African-American.
- From 2006 through 2011, 31 NSF CAREER Awards were received by College of Engineering faculty members. Eight more individuals were hired by the college who had received CAREER Awards elsewhere. Three individuals received PECASE Awards, and three others were hired who had received PECASE Awards elsewhere.
- Between 2006 and 2011, two of our colleagues were honored with the Franklin Medal, one received a MacArthur “Genius” Grant, and two were elected to the National Academy of Engineering.
- Five of the six best years for college fundraising have occurred between academic year 2005-2006 and academic year 2010-2011 when an average of \$16.3M was annually raised.<sup>7</sup> The average was \$9.1M for the preceding six years.
- In 2005 the target for the College of Engineering in the *Campaign for Virginia Tech* was \$117M. That capital campaign target was later raised to \$155M and the college finished the campaign with \$205M raised.
- Three new buildings for the Institute of Critical Technology and Applied Science (ICTAS) were opened in 2007, 2009, and 2011, adding approximately 175,000 gross square feet of much needed research space. Although not solely an engineering endeavor, ICTAS has greatly expanded the College of Engineering’s ability to pursue its research agenda.
- In 2011 construction was begun on the 153,000 gross square feet Signature Engineering Building which is expected to open in spring 2014.
- In 2011 new space for the college was acquired at the Virginia Tech Research Center in Arlington (VTRCA). New College of Engineering space has also been acquired in Hampton Roads, Danville, and Blacksburg.<sup>8</sup>
- Research expenditures grew from \$53.6M in 2004-2005<sup>9</sup> to \$152.7M in 2010-2011. In the same period, research spending per faculty member increased from \$172,500 to \$461,200. The college moved up three places, from 13<sup>th</sup> to 10<sup>th</sup> in the National Science Foundation ranking of research expenditures by engineering colleges.
- 4,800 prospective students applied for admission to the College of Engineering for fall 2005. 7,171 prospective students applied for fall 2012, more than a 50% increase.
- Starting with fall 2010, the target size for the freshman engineering class was raised from 1200 to 1300, an 8% increase.
- The entering freshman class in 2005 was 15.6% female, 2.1% African-American, 1.8% Hispanic and 0.2% American Indian. The entering freshman class in 2011 was 20.1% female, 2.9% African-American, 6.3% Hispanic and 0.2% American Indian.

---

<sup>6</sup> This includes Biological Systems Engineering in the College of Agriculture and Life Sciences.

<sup>7</sup> It is generally the case that half of our gift income comes from alumni and half comes from corporate friends.

<sup>8</sup> The Blacksburg sites include the Corporate Research Center and Plantation Road.

<sup>9</sup> This was an anomalously low performance. Research spending was about \$70M in the two prior years.

- In 2008 we had 13 undergraduate programs reviewed by the Accreditation Board for Engineering and Technology (ABET). All were successful. In 2010 accreditation was received for a new program in construction engineering and management.
- In fall 2005 the college's graduate enrollment was 1,728. By fall 2011 the graduate enrollment had increased 35% to 2,336.
- In 2007 the college secured the Engineering Fee which produces about \$3.8M annually in support of our instructional facilities.
- In 2012 the university approved the college's request to limit new enrollment in any major to six times the associated faculty headcount.

Members of the College of Engineering can take great pride in these achievements, particularly in the fact that they occurred in an era that held great adversity. It gives us confidence that the college will continue to grow and prosper over the next six years.

**Theme 1: Provide a high quality environment for teaching, learning and research.**

The College of Engineering provides an outstanding education to a great many students, consistently ranking in the top ten producers of new engineering baccalaureates. Rapidly growing application numbers, rapidly growing research investments, and robust recruiting all speak to the high standing that the college has with external constituencies. College resources, however, are not in line with the current scale and success of our program, nor with our aspirations. The college will need to take vigorous steps in the next six years to acquire the support it needs to build upon its top-tier status.

Emphases:

- E1.1 Grow and retain a high quality and diverse faculty and staff, including post-docs, in order to remain in balance with our large student body and growing research portfolio.
- E1.2 Study and make recommendations for action on whether the college should make greater use of non-tenure-track teaching faculty, including professors of practice.
- E1.3 Improve and expand the college infrastructure at a faster pace, at lower cost, with greater flexibility, and in a sustainable fashion.
- E1.4 Increase the college endowment as a means to enhance our academic programs beyond what is possible through state and tuition revenue alone.
- E1.5 Extend the global reach of the college by expanding international activities in teaching, learning, and research.
- E1.6 Provide leadership at the university level for investments in high-performance computing facilities, visualization and networks.
- E1.7 Ensure that our instructional technologies are modern and versatile, particularly when used in an active-learning environment or when used for distance and distributed learning.
- E1.8 Increase the productivity of our faculty and staff by making greater use of information technology<sup>10</sup> and more efficient business practices.

---

<sup>10</sup> An electronic Faculty Activity Report (e-FAR) is an example.

Measures:

- M1.1 Increase the faculty size from 331 to 365.<sup>11</sup>
- M1.2 Increase the internally supported administrative staff from 175 to 190.
- M1.3 Increase the non-tenure track teaching faculty from 20 to 25.<sup>12</sup>
- M1.4 Increase the non-tenure track research faculty from 113 to 150.
- M1.5 Decrease the undergraduate student-to-teacher ratio from 20-to-1 to 18-to-1.<sup>13</sup>
- M1.6 Increase the college development staff from 4 to 7.<sup>14</sup>
- M1.7 Increase annual contributions to the college endowment from approximately \$16M per year to \$20M per year.
- M1.8 Open the Signature Engineering Building.
- M1.9 Renovate Randolph Hall.
- M1.10 Acquire state support for the Computer Science and Engineering Building in the New Engineering Precinct.<sup>15</sup>
- M1.11 Plan for the renovation and expansion of Holden Hall.
- M1.12 Provide a minimum of five annual Faculty Development Institute training sessions on active-learning teaching methods for faculty members and graduate teaching assistants.

**Theme 2: Recruit, educate and graduate a high-quality and diverse undergraduate student body.**

Since 2005 the applicant pool for the Virginia Tech College of Engineering has grown by over 50%, and the entering class has become stronger and more diverse. In 2010 we increased the target size of the freshman class from 1,200 to 1,300. There is never a time when the engineering world is not changing rapidly. As such, there is an ever-present need to expose our students to contemporary issues and to prepare them for a complex and global environment. In a comparison to other top-tier programs, Virginia Tech is a leader in its adoption of new pedagogical tools and in its focus on “hands on, minds on” learning. It is particularly important that we maintain this leadership role at a time when advancing technologies permit rapid communication among many people distributed throughout the world. Diversifying the class and creating additional opportunities for international experiences will remain priorities for the college. We will continue to provide leadership to the state and nation in STEMH<sup>16</sup> recruiting initiatives by remaining one of the nation’s largest suppliers of new, well-trained engineers.

Emphases:

- E2.1 Informed by engineering education research, offer innovative undergraduate degree programs that include flexibility for active learning, multidisciplinary explorations, research, co-ops, internships, and problem-solving in a globally complex environment.
- E2.2 Continue with the plan to add 400 new undergraduate engineering students (100 per class) by 2014, so that the target size of the entering class is 1300.

---

<sup>11</sup> The current faculty size of 331 includes 15 BSE faculty members. In 2009-2010 Texas A&M was #4 with 360 engineering faculty members. Virginia Tech was #8 with 314.

<sup>12</sup> This target could increase substantially if the college chooses to make greater use of non-tenure-track instructors.

<sup>13</sup> In 2010-2011 VT had 6463 full-time and 113 part-time undergraduate students, and 331 faculty members.

<sup>14</sup> This includes the director, 4 who work with alumni (up from 2) and 2 who work with corporations (up from 1).

<sup>15</sup> The New Engineering Precinct lies between Durham Hall and the Signature Engineering Building.

<sup>16</sup> STEMH = Science, Technology, Engineering, Math, Health.

- E2.3 Give our undergraduates specialized design and computing skills, especially in the first two years, that will put them in high demand for co-ops and internships.
- E2.4 Continue to offer the “hands on, minds on” education that makes our graduates highly sought-after for employment or graduate school.
- E2.5 Promote the integration of instructional technologies with pedagogy, including those technologies that utilize “cloud computing.”
- E2.6 Offer an expanded array of summer programs, information sessions, scholarship opportunities, mentoring programs, and retention programs.
- E2.7 Use the Engineering Fee to maintain and improve the quality of our instructional labs.

Measures:

- M2.1 Increase B.S. degrees awarded from 1270 to 1300.<sup>17</sup>
- M2.2 Increase the fraction of graduating students who have had an undergraduate research experience from 55% to 65% of the class.
- M2.3 Increase the annual percentage of students involved in international experiences, including study abroad, service learning, and internships, from 2% to 5% of the class.<sup>18</sup>
- M2.4 Increase the fraction of graduating students who have had a co-op or internship from 58% to 68% of the class.<sup>19</sup>
- M2.5 Track the number of Virginia Tech engineering undergraduates that have a co-op or internship outside of the United States.
- M2.6 Increase the size of active learning spaces by increasing the size of the Ware Lab from 6,000 square feet to 8,000 square feet.

**Theme 3: Recruit, educate and graduate a high-quality and diverse graduate student body.**

From 2005 to 2011, the college’s graduate enrollment grew 35%. Despite this growth, roughly a dozen engineering colleges have larger graduate enrollments than at Virginia Tech.<sup>20</sup> To draw even with other highly-ranked peers and to support a rapidly expanding research portfolio the college needs to grow its graduate student population, particularly at the Ph.D. level. The college needs to greatly increase its resources for graduate teaching assistantships. As for its undergraduate students, diversifying the graduate student population and creating additional opportunities for international experiences are priorities.

Emphases:

- E3.1 Offer degrees and research opportunities that feature applications to critical national needs, cross-disciplinary knowledge and global engineering skills.

---

<sup>17</sup> This would match the target size of the entering class, which was increased from 1200 to 1300 in fall 2010. In 2009-2010 Michigan was #4 with 1251 B.S. graduates. Virginia Tech was #6 with 1182. There was a sizeable 7.5% increase in Virginia Tech engineering graduates from 1182 in 2009-2010 to 1270 in 2010-2011.

<sup>18</sup> These percentages apply only to students that actually travel out of the country and not, for example, to students who remain in the U.S. and participate in courses that are simultaneously taught to audiences in multiple countries.

<sup>19</sup> This is the percentage of engineering graduates indicating participation in an internship (paid and/or unpaid) and/or a co-op experience among respondents to the 2009-2010 Career Services Graduate Survey.

<sup>20</sup> In 2009-2010 Virginia Tech had the nation’s 13<sup>th</sup> largest graduate enrollment, 6<sup>th</sup> largest undergraduate enrollment and 8<sup>th</sup> largest faculty size.

- E3.2 Offer an expanded array of information sessions and mentoring and retention programs.
- E3.3 Increase our competitiveness for domestic graduate students.
- E3.4 Greatly increase the number of university funded graduate teaching assistantships (GTAs) both as a means of addressing the undergraduate student to teacher ratio, and as an attraction to students to choose Virginia Tech for their graduate studies.
- E3.5 Advance well-funded research programs that provide ample external support for graduate research assistantships (GRAs).
- E3.6 Seek more externally funded fellowships for our graduate students.
- E3.7 Provide distance and distributed learning opportunities to students in the Commonwealth of Virginia and beyond utilizing the best instructional technologies.<sup>21</sup>

Measures:

- M3.1 Increase the number of M.S. graduates from 455 to 500.<sup>22</sup>
- M3.2 Increase the number of Ph.D. graduates from 154 to 200.<sup>23</sup>
- M3.3 Increase the number of university funded, academic year GTAs from 272 to 325.
- M3.4 Increase the number of externally funded, calendar year GRAs from 843 to 1000.
- M3.5 Increase the number of graduate fellowships from 206 to 225.
- M3.6 Have six information sessions annually for prospective graduate students, including domestic students, with half outside of Blacksburg and half aimed at under-represented communities.
- M3.7 Identify three new online degree or certificate programs that could be offered with support from the Enterprise Fund of the Institute for Distance and Distributed Learning.

**Theme 4: Address problems of regional, national and global importance.**

Over the last six years college research expenditures more than doubled, and, while this is an excellent trajectory, we still show modest numbers on a per-faculty-member basis. In the 2010-2011 assessment of graduate programs published by *U.S. News and World Report* in spring 2012, 43 colleges reported greater research spending per faculty member than at Virginia Tech. In the next six years we should see a significant closing of the gap with top-20 peers.<sup>24</sup> The college will, unquestionably, be a major contributor to the university's goal of making advancement in the fields of security, resilience, health, and sustainability.

Emphases:

- E4.1 Advance solutions in the areas of the 10 most important problems facing mankind as presented by Nobel Laureate Richard Smalley. In rank-order they are: (1) Energy, (2) Water, (3) Food, (4) Environment, (5) Poverty, (6) Terrorism & War, (7) Disease, (8) Education, (9) Democracy, and (10) Population.
- E4.2 Engage in interdisciplinary research, especially through the seven research institutes of Virginia Tech.

---

<sup>21</sup> This is particularly important to faculty members located outside of Blacksburg.

<sup>22</sup> In 2009-2010 Arizona State was #18 with 500. Virginia Tech was #23 with 452.

<sup>23</sup> In 2009-2010 Texas-Austin was #9 with 205. Virginia Tech was #14 with 154.

<sup>24</sup> If the *U.S. News and World Report* graduate ranking was based solely on reputation, as is the case for the undergraduate ranking, then Virginia Tech would rank in the top-20.

- E4.3 Engage in multi-organizational and multi-national research.
- E4.4 Honor our Land Grant heritage by bringing economic vitality to the New River Valley, the Commonwealth of Virginia, the nation and the world.
- E4.5 Encourage the commercialization of our research through patents, intellectual property licenses and the creation of start-up businesses.
- E4.6 Encourage faculty, staff and students to be active in their professional communities.
- E4.7 Encourage faculty, staff and students to share the results of their scholarship with a broad audience.

Measures:

- M4.1 Increase annual new research awards from \$110M to \$210M.
- M4.2 Increase annual research expenditures from \$153M to \$210M.<sup>25</sup>
- M4.3 Increase annual research spending per faculty member from \$461,200 to \$600,000.<sup>26</sup>
- M4.4 Increase the number of annual awards greater than \$1M from 8 to 20, and increase the number of annual awards greater than \$2M from 2 to 10.<sup>27</sup>
- M4.5 Support one faculty member per year on an “entrepreneurial sabbatical.”
- M4.6 Keep a record of all faculty members that hold the rank of Fellow in one or more professional organizations.<sup>28</sup>
- M4.7 Keep an annual record of the number of publications produced by the faculty in peer-reviewed journals and conference proceedings.<sup>29</sup>
- M4.8 Keep an annual record of patents and intellectual property licenses produced by the faculty.

**Theme 5: Support a diverse community of faculty, staff and students.**

From 2005 to 2011 we made good strides in diversifying the faculty, staff and student body in the College of Engineering. The first woman to head an engineering department was hired in 2008 and the first African-American to head an engineering department was hired in 2011.<sup>30</sup> Our entering classes at both the graduate and undergraduate levels are more diverse today than they were in 2005. Despite these welcome gains, our progress has not always been steady<sup>31</sup> and we do not always compare well to peer institutions. Vigorous recruiting and retention efforts will be needed over the next six years to enhance our standing as a college where a diverse community of scholars thrives. Improving our standings in national benchmarks makes the College of Engineering stronger and presents a more welcoming environment in the eyes of students, faculty, staff, alumni and friends. True to the “Principles of Community,” the college practices equal opportunity and fairness, and we expect to see a growing diversity in the college as a natural consequence of our ongoing efforts in recruitment and mentoring, along with a regular

<sup>25</sup> In 2009-2010 Illinois was #2 with \$213M. Virginia Tech was #15 with \$135M.

<sup>26</sup> In 2009-2010 UCLA was #22 with \$594,300. Virginia Tech was #46 with \$397,600.

<sup>27</sup> In 2010-2011 the college had 8 awards over \$1M and 2 awards over \$2M.

<sup>28</sup> While other society-level metrics could be tracked, we believe that the total number of Fellows will be reflective of the overall engagement of the college with professional organizations.

<sup>29</sup> While other forms of scholarly output could be tracked, we believe that the total number of peer-reviewed papers appearing in journals and conference proceedings will be reflective of the overall output of the college.

<sup>30</sup> This is in regard to a permanent appointment. The first African-American to serve as a department head on an interim basis was in the 2010-2011 academic year.

<sup>31</sup> In 2003 we had more African-Americans in the freshman class, 73, than in any year since.

examination of the Virginia Tech working environment. To this end, we are fortunate to be assisted by several award-winning programs, most notably the Center for the Enhancement of Engineering Diversity (CEED) and AdvanceVT.

Emphases:

- E5.1 Provide an environment that is supportive of a diverse community, resulting in increased numbers from traditionally under-represented groups and under-served communities.
- E5.2 Provide mentoring so that students of all backgrounds, especially first-generation college students, may find a successful path to graduation.
- E5.3 Provide mentoring so that new faculty members and new staff members may flourish in their careers.
- E5.4 Provide opportunities to faculty members and staff members to acquire new skills and engage in life-long learning.
- E5.5 Support programs like AdvanceVT that help modernize the working environment and enhance the work-life balance.
- E5.6 Incorporate the work of the Center for the Enhancement of Engineering Diversity into departmental teaching and research efforts.
- E5.7 Make greater use of the COE Diversity Committee, particularly as a complement to the work of CEED.<sup>32</sup>
- E5.8 Be more proactive and less reactive in our recruiting for diversity.
- E5.9 Live by the “Principles of Community.”

Measures:<sup>33</sup>

- M5.1 Increase the number of tenured and tenure-track faculty members who are female from 39 to 50; who are African-American from 10 to 15; and who are Hispanic from 16 to 20.<sup>34</sup>
- M5.2 Increase B.S. degrees to women from 180 to 220;<sup>35</sup> to African-Americans from 29 to 55;<sup>36</sup> and to Hispanics from 35 to 60.<sup>37</sup>
- M5.3 Have M.S. and Ph.D. graduating classes be more than 20% women, 7% African-American and 7% Hispanic.<sup>38</sup>
- M5.4 Track the number of faculty members that utilize the services promoted by AdvanceVT.<sup>39</sup>

---

<sup>32</sup> It has been suggested that the Diversity Committee could focus its efforts on graduate student recruiting and retention as a complement to the work being done by CEED in undergraduate recruiting and retention.

<sup>33</sup> We have struggled to set measures for American Indians, who are currently represented in our student, staff and faculty bodies in very small numbers. ASEE also does not provide comparison statistics. We will nevertheless track, and seek to increase, the number of American Indians in the College of Engineering.

<sup>34</sup> According to the 2009-2010 ASEE tables, this would put Virginia Tech in the top-5 in each group. Virginia Tech is currently #9, #10, and #7, respectively.

<sup>35</sup> In 2009-2010 Penn State was #6 with 220. Virginia Tech was #12 with 180.

<sup>36</sup> In 2009-2010 City College in New York was #7 with 54. The ASEE ranking does not extend beyond the #20 school.

<sup>37</sup> In 2009-2010 New Mexico State was #20 with 63. The ASEE ranking does not extend past the #20 school.

<sup>38</sup> Each of these percentages is several points higher than our B.S. targets. ASEE does not report graduate diversity numbers as fully as it reports undergraduate diversity numbers.

<sup>39</sup> Stop the tenure clock, mentoring programs, dual-career placement, etc.

## Appendix - Map to the University Long-Range Plan

The University's "Plan for a New Horizon" addresses 4 structuring challenges, and 3 strategies for responding to those challenges. The summary of each of those areas follows. The table below maps the structuring challenges and the strategies for responding to those challenges as outlined in the University's Long-Range Plan to the themes and emphases of the College of Engineering's Strategic Plan.

| <b>University Long-Range Plan: <i>Structuring Challenges</i></b>  | <b>College of Engineering Strategic Plan: <i>Themes</i></b>   |
|---|---|
| Responding to the implications of global interdependence  | Recruit, educate, and graduate a high-quality and diverse student body; Support a diverse community of faculty, staff, and students |
| Responding to the needs and challenges of a data-driven society   | Recruit, educate, and graduate a high-quality and diverse student body  |
| Research that is translational in nature, serving the good of local communities, our Commonwealth, and the nation | Address problems of regional, national, and global importance   |
| Ensuring quality, innovation, and results through organizational flexibility and efficiency                       | Provide a high-quality environment for teaching, learning, and research   |

| <b>University Long-Range Plan: <i>Responding to the Challenges</i></b>  | <b>College of Engineering Strategic Plan: <i>Emphases that Map to the University Plan</i></b>  |
|---|--|
| Strategies for research and innovation:<br>-Pursuing translational research focusing on security, resilience, health, and sustainability;<br>-Developing strategies to leverage networked collaborations;<br>-Building pathways to interdisciplinary success. | -Grow and retain a high quality and diverse faculty and staff.<br>-Extend the global reach of the College by expanding international activities.<br>-Advance solutions in the areas of the 10 most important problems facing mankind as defined by Nobel Laureate Richard Smalley that are a result of interdisciplinary, multi-organizational, and multi-national research.<br>- Encourage the commercialization of our research through patents, intellectual property licenses, and the creation of start-up businesses.<br>-Provide leadership at the university level for investments in high-performance computing facilities, visualization, and networks.  |
| Strategies for the Life of the Mind<br>-Inspiring creativity, curiosity, and critical thinking;<br>-Building a new vision for undergraduate general education;<br>-Supporting e-learning.   | -Recruit and graduate a diverse and high-quality student body.<br>- Informed by engineering education research, offer innovative undergraduate degree programs that include flexibility for active learning, multidisciplinary explorations, research, co-ops, internships, and problem-solving in a globally complex environment.<br>-Enhance the educational experience for our students by promoting the integration of instructional technologies with pedagogy.<br>-Offer degrees and research opportunities that feature applications to critical national needs, cross-disciplinary knowledge, and global engineering skills.<br>-Provide distance and distributed learning opportunities to students in the Commonwealth and beyond. |
| Virginia Tech Experience<br>-Enhancing quality-of-life initiatives that support the workplace.<br>-Implementing the Climate Action Commitment and Sustainability Plan in order to foster diversity and inclusion and attract the best.                        | -Provide an environment that is supportive of a diverse community.<br>-Support programs like AdvanceVT.<br>-Incorporate the work of the Center for the Enhancement of Engineering Diversity into departmental teaching and research efforts.<br>-Be more proactive and less reactive in our recruiting for diversity.<br>-Live by the "Principles of Community."   |