

## Chapter 5A: Strategies for Research and Discovery

CSU's College of Engineering has excellent faculty and strong research programs. The primary difference between CSU's College of Engineering and other top-ranked peers is the size of our faculty. With only 93 faculty (FY'06), CSU's College of Engineering is about half the size of the average of the top 80 colleges of engineering. Increasing the size of our faculty is a fundamental goal that not only supports research and discovery, but is critical to providing excellence in undergraduate education.

Colorado State University's College of Engineering generates annual research expenditures per tenured and tenure-track faculty member that are consistent with many excellent public and private institutions (Figure 5A.1 and Table 5.2, page 5-5). Given that the College's annual research expenditures exceed an average of \$500K per faculty member, further significant improvements in funding will require investment in new faculty lines<sup>1</sup>.

The following goals and strategies support CSU objectives for research and discovery:

**Objective:** Foster excellence in research and scholarship

**Goal:** Create an environment that inspires and enables faculty to become leaders in their respective fields.

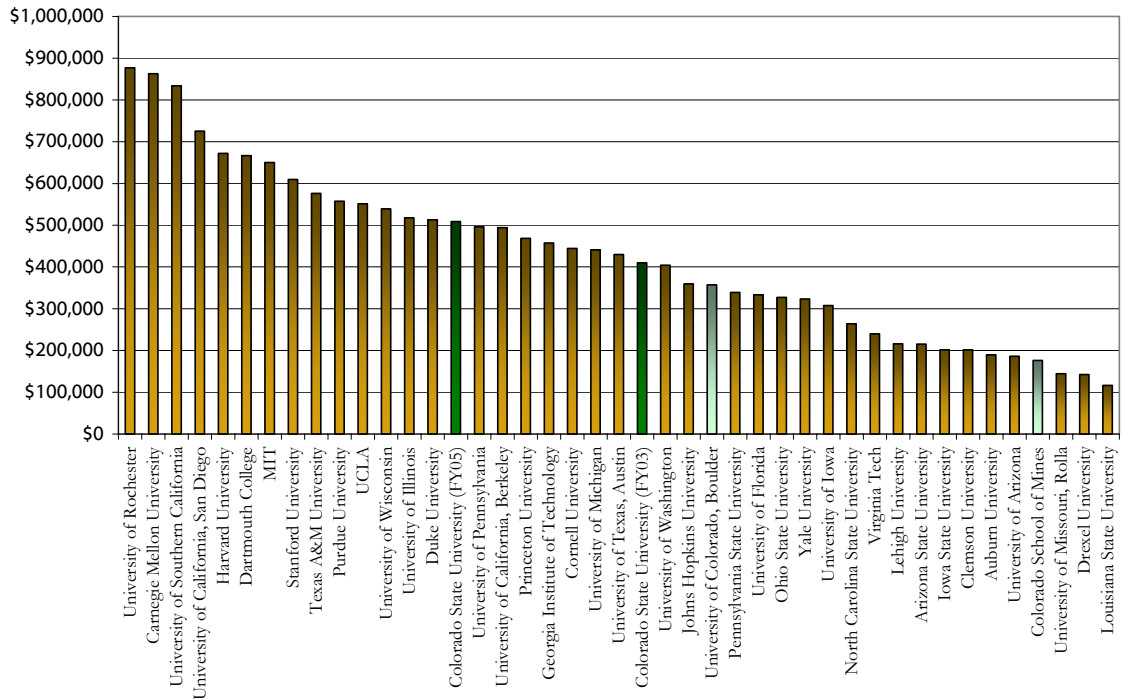
### Strategies:

- ✘ Attract, hire, and retain the top faculty in the field through ongoing strategic planning,
- ✘ Increase the number of faculty,
- ✘ Increase the number of endowed professorships and chairs,
- ✘ Achieve an integrated balance of research and teaching,
- ✘ Recruit and retain excellent students,
- ✘ Sustain and nurture existing programs of research and scholarly excellence,
- ✘ Identify and nurture new areas of strategic importance that align with college and university priorities and strengths,
- ✘ Offer competitive compensation packages to attract and retain top faculty and staff,
- ✘ Maintain and generate a critical mass of faculty in priority areas,
- ✘ Co-locate people around strategic areas with access to excellent facilities,
- ✘ Create an environment that fosters strategic alliances among faculty, and
- ✘ Provide appropriate staff support and infrastructure for faculty research and scholarship.

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<sup>1</sup> The range in annual research expenditures per faculty member in the College of Engineering is large (\$0 to more than \$3M/year; plus CIRA). The ability to significantly increase research expenditures without additional faculty is limited to increasing the average funding per faculty. At more than \$500K/year, CSU's funding per faculty exceeds most of our comparators and is consistent with annual faculty funding at top-ranked colleges of engineering (Chapter 2).

**Figure 5A.1 Annual Expenditures per Tenured/Tenure Track Faculty (FY03)**



**Goal:** Increase externally funded research.

**Strategies:**

- ✘ Hire additional faculty,
- ✘ Achieve an integrated balance of research and teaching,
- ✘ Create an economic development initiative that results in increased support for CSU and for its research programs (Chapter 5B), and
- ✘ Encourage and assist departments to diversify their faculty funding base (to increase research productivity among all faculty members).

**Objective:** Improve discovery capabilities,

**Goal:** Where appropriate, encourage each department to grow the base of post-doctoral fellows, research faculty, and/or graduate research assistants, commensurate with higher levels of external funding and goals for teaching excellence.

**Strategies:**

- ✘ Hire additional faculty who provide direct support for graduate research assistants, post-doctoral fellows, and research faculty,
- ✘ Support research scientists/faculty by:
  - ✘ Providing opportunities for multiple year contracts,

- ✘ Facilitating development of “savings” for research scientists/faculty to allow them to bridge periods of low funding, and
- ✘ Mentoring research scientists/faculty for promotion within a career track,

**Goal:** Construct and equip new laboratories and other research facilities.

**Strategies:**

- ✘ Construct new facilities to support research and academic programs and to aid in recruiting faculty and students,
- ✘ Construct new facilities that will promote interdisciplinary interaction among students, faculty, and staff within the College of Engineering and throughout CSU.

**Objective:** Focus research in areas of strength and societal need,

**Goal:** Encourage synergy and facilitate collaborative and cooperative efforts among scholars with interests in common problems, and

**Goal:** Encourage scholarship that addresses important social, political, economic and cultural issues.

**Strategies**

- ✘ Establish agile interdisciplinary programs that can adapt to changing societal needs:
  - ✘ Our national prominence in areas such as climate change, IS&T, materials science and processing, water resources, energy, and environmental quality align well with the university’s goals for interdisciplinary research.
- ✘ Develop new collaborations that broaden and strengthen our interdisciplinary focus:
  - ✘ Federal agencies such as NREL, NIST, and CDC strongly complement our current strengths in the environment, energy conservation, materials and biomedical engineering,
  - ✘ Engineering can play a leadership role in creating opportunities for research with excellent programs and departments in other CSU colleges,
  - ✘ The COE is an ideal catalyst for forging stronger connections among colleges, and with K-12 educators and industry to promote stronger interdisciplinary and cross-cultural cooperation.
  - ✘ The COE can provide leadership in developing relationships with business and industry.
- ✘ Accomplish goals through the judicious hiring of tenure-track and tenured faculty with a strong interdisciplinary research focus, and
- ✘ Work with the University to establish seed money for exploratory interdisciplinary investigations.

**Metrics:**

- ✘ Faculty awards,
- ✘ Total research expenditures,
- ✘ Total research expenditures per tenured and tenure-track faculty,
- ✘ Percent of faculty proposing (target 75%),
- ✘ Percent of award dollars to 10% of regular tenured and tenure-track faculty (target less than 50%),
- ✘ Number of post-doctoral fellows, research faculty, and graduate research assistants, and
- ✘ Interdisciplinary proposals.