

I. Institutional Goals

The University of Colorado Boulder is a comprehensive, residential research university. This first chapter summarizes the planning goals and then looks at trends and projections for the three primary measures of the institution’s size: student enrollment, extent of research endeavors, and faculty/staff employment.

A. Planning Goals

1. Vision, Mission, and Strategic Planning

The goals and objectives outlined in the Campus Master Plan align the university’s physical environment with the adopted strategic plan for the institution—Flagship 2030. The strategic planning process, conducted in 2007, established a core vision for the university that states:

The University of Colorado Boulder will become a leading model of the “new flagship university” of the 21st century—by redefining learning and discovery in a global context and setting new standards in education, research scholarship, and creative work that will benefit Colorado and the world.

To achieve this vision, six central themes emerged:

- The university environment will be intellectually inspiring, academically challenging, welcoming, supportive, and conducive to positive personal growth.
- CU-Boulder will become a dynamic global force for nurturing ideas and the uses of knowledge.
- The university will be a place that exemplifies diversity, intercultural understanding, and community engagement.
- CU-Boulder will help promote Colorado as a global crossroads of ideas and discovery.
- The university will provide students with a foundation of knowledge that will help them reach their full potential.
- CU-Boulder will be an agile organization supported by effective leadership, financial and operational models, and infrastructure.

The Flagship 2030 Strategic Plan calls for a two-pronged approach to achieving this vision—core service areas remaining competitive and maintaining quality and “flagship initiatives” for transforming the university.

2. Core Initiatives of Flagship 2030

Flagship 2030 identifies eight core initiatives that are necessary to remain competitive in the short term. The priorities are:

- **Enhancing Education and Scholarship.** Increase the size and enhance the quality of faculty by adding

300 new tenure-track faculty in the next ten years; create a new model for undergraduate education to better prepare CU-Boulder students for a changing world.

- **Fostering Research Excellence.** Support the research mission by increasing institutional funding and research expenditures by 5 percent each year; provide targeted investments in cutting-edge research and creative work.
- **Enhancing Graduate Education.** Increase the graduate student population from the current 15 percent of total enrollment to 20 percent.
- **Ensuring Access.** Double merit- and need-based financial aid within five years; initiate a statewide dialogue on expanding access to Colorado higher education.
- **Supporting the Mission.** Increase the university’s staff to support education, research and creative work, service, and operations.
- **Investing in the Tools for Success.** Increase investments in new technologies, new and existing campus facilities, and library collections
- **Learning for a Diverse World.** Implement new strategies for improving diversity; foster a supportive and inclusive climate for all.
- **Serving Colorado, the Community, and Graduates.** Expand outreach programming aimed at Colorado communities; enhance opportunities for lifelong and distance learning.

3. The Flagship Initiatives

The Flagship Initiatives represent the long-term aspirations that will distinguish CU-Boulder as among the very best of public research institutions. These initiatives include:

- **Residential Colleges.** The campus intends to build on its successful Residential Academic Programs (RAPs) by creating a new campus-wide emphasis on “residential colleges,” offering a multi-year residential academic experience for every entering student.
- **Customized Learning.** The campus will launch the “Colorado Undergraduate Academy” as an ongoing incubator for innovative learning methods and customized learning experiences. The academy will provide mentoring, individualized advising, and career counseling, as well as help attract more of the nation’s best-qualified students to the university.
- **Experiential Learning.** The campus will incorporate experiential learning programs more broadly in every student’s education. These experiences may include research or creative projects with a professor, study abroad, honors or senior thesis projects, entrepreneurial initiatives, portfolios of creative work, full-time community service projects, or internships.
- **Colorado’s Research Diamond.** The campus will initiate a “Colorado research diamond” as a collaborative enterprise among regional universities, businesses, government, and federal laboratories.

The research diamond will draw upon existing strengths to develop new technologies, patents, and intellectual properties—and apply them to real-world needs in Colorado and the world.

- **Transcending Traditional Academic Boundaries.** The campus will build upon its excellent record in interdisciplinary research and creative work to become a global leader in ventures that span traditional academic fields. CU-Boulder will strengthen its advocacy, support, recognition, and financial incentives for faculty and students who engage and excel in interdisciplinary work.
- **Building a Global Crossroads.** The campus will establish a “Colorado Center for Global Education, Research, and Advanced Studies” that will bring the world’s best thinkers to visit, work, and study at CU-Boulder. The center’s competitively selected “Colorado Fellows” will address specific global issues facing government, business, industry, communities, the state, and society at large. In addition, student and faculty exchanges around the world will be expanded.
- **Creating University Villages.** The campus will develop a new “university villages” concept to guide plans for the build-out of major university properties. Working in collaboration with community leaders, mixed-use, education-related spaces that meet the needs of the university, the community, and the state are proposed.
- **Alternative Degree Tracks.** The campus will expand the options for earning University of Colorado Boulder degrees, providing greater emphasis on the master’s degree as a primary track, greater support for students with advanced placement credits, and concurrent bachelor’s/PhD degree programs in appropriate disciplines.
- **Year-round Learning.** Within the next three years, CU-Boulder will examine changing the university’s academic calendar to a three-semester, year-round schedule. This significant change in academic culture would expand learning and research opportunities for both students and faculty—and make better use of resources, including facilities, personnel, and equipment.
- **Making Enterprise Work.** The campus will seek greater operating flexibility and expanded resources to meet our role and mission. A new relationship with the state of Colorado will emphasize the university’s public mission and accountability under a more self-reliant and market-driven model. Private fundraising efforts in support of university initiatives will be enhanced.

4. Campus Master Plan Goals

The Campus Master Plan establishes the facilities framework describing how the facilities will support the institution’s vision and mission. Facilities must support teaching, research, community service, student development, and the deployment of effective technology.

CU-Boulder has a long tradition of campus planning that has been successful in accomplishing this through establishing and preserving the essential elements that make the institution unique, identifying the long-range goals that align with the strategic goals, and creating actionable goals that can be realized within the planning period.

Six campus master planning goals are retained from previous plans:

- Provide high-quality facilities to meet institutional needs.
- Preserve and enhance the traditional beauty of the campus.
- Acquire and use land wisely.
- Design campus systems (infrastructure) to ensure an efficient, pleasing, and safe campus for many years to come.
- Ensure access through improvements in all modes of transportation.
- Provide additional housing to maintain or increase the percentage of students housed on campus.

To align with the strategic goals of the institution, this plan adds four goals:

- Expand the living-learning community to create university villages and residential colleges.
- Engage the university in the community.
- Reduce the relevance of distance, within both the campus and the global context.
- Develop sustainable facilities that are economically sound, environmentally responsible, and socially just.

The following goals are specific to the planning period (through the 2020-2021 academic year).

- Accommodate a projected enrollment growth of 9 to 11 percent.
- Facilitate increased graduate student enrollment to support research endeavors.
- Retain the ten-minute class change zone for most courses on the Main Campus and establish an equivalent, offset class change zone for the East Campus.
- Address family housing and the flood hazard for the areas north of Boulder Creek.
- Begin to address the need for affordable housing for faculty and staff.

5. Sustainability

This edition of the Campus Master Plan elevates sustainability in all aspects. It will move CU-Boulder toward a new synergy of educational excellence and campus-as-classroom opportunities in sustainability. The campus will continue to implement leadership policies and practices that further reduce its ecological footprint through innovative practices in planning, design, construction and operation of facilities, infrastructure, and processes.

This master plan seeks to balance the sometimes competing—and sometimes complimentary—drivers of conservation, cost, carbon, and community within an educational platform enhanced by sustainability infrastructure and improved social connectedness on and off campus.

As signatories to the American College & University Presidents’ Climate Commitment (ACUPCC), the university will be using several guiding frameworks to ensure that its buildings and practices are as sustainable as possible. New buildings are constructed to forward looking standards for sustainability and green building design established by the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED). The current policy of LEED Gold certification for new construction and major renovation has served the campus well. Moving forward, the campus will target additional points in the areas of energy and water consumption to focus on reducing the total cost of ownership and move toward near net-zero energy buildings, thus striving to meet the carbon goals of the ACUPCC. The second guiding framework is the Sustainability Tracking and Rating System (STARS) set up by the Association for the Advancement of Sustainability in Higher Education (AASHE). STARS provides a checklist system much like LEED, but unlike LEED, an entire campus is assayed for an array of sustainability characteristics including academics, research, operations, policies, co-circular activities, and human and community impacts. CU-Boulder is the first STARS Gold university in the nation. This creates a standard set of metrics by which CU-Boulder’s sustainability efforts will be judged by outside observers for years to come.

6. Preservation

In the Campus Master Plan goals, there is a balance between preservation and growth. The beauty of the Main Campus is a major asset of the university. There is a long-term commitment to maintaining and enhancing the aesthetic qualities, both of the buildings and of the open spaces between. Continuing to use the palette of building materials, which includes sandstone walls, clay tile roofs, and limestone trim, is essential but not sufficient. The entire design fabric, including the outdoor areas, is important. Former Campus Architect William R. Deno wrote,

To understand how to successfully integrate a new project into the design fabric of the Boulder campus, one first needs to look at the basic principles of the original Klauder Campus Development Plan and associated building architecture.... The spaces between buildings and wings of individual buildings ranged from small and intimate to large and spacious. This variety of outdoor rooms is a key element in the charm of the Boulder campus.¹

It is this interplay between the open space and the

¹ William R. Deno, *Body & Soul: Architectural Style at the University of Colorado at Boulder*, 1994.

buildings that surround it that is critical for designers to understand when working on one of the established CU-Boulder campuses.

Preservation of existing buildings will be critical in the ten-year planning period and beyond. Funding for new construction may be limited. Eighty-five percent of CU-Boulder’s facilities are more than 25 years old and 45 percent of buildings are more than 50 years old. While some of the buildings have had substantial renovations, like the Koelbel Building for the Leeds School of Business, most have not. With more than \$300 million in deferred maintenance on the Boulder campus, renovation, restoration, and renewal of existing campus buildings will be a major focus within the planning period.

7. Growth

This Campus Master Plan proposes strategies to accommodate a modest increase in enrollment, a moderate increase in research, and additional space to accommodate existing programs. Growth on the Main Campus will be very limited. The East Campus and Williams Village properties, where vacant land is available for development, will see the bulk of new growth. CU-Boulder South will continue to be reserved as a land bank for future generations, with the exception that flood mitigation and control structures may be developed with other governmental agencies.

This strategy is largely the result of analyses of the campus infrastructure and its ability to serve new programs and functions. The existing utility infrastructure was planned and built during the 1960s to support an anticipated enrollment of 20,000 students. There have been incremental improvements to this original plan that have allowed the campus to accommodated its current enrollment and research endeavors, but its potential for continued development is limited.

Many of the scientific buildings on campus also come from the 1960s building boom. They lack the mechanical infrastructure and room heights typical of modern science facilities. Maintaining research in these building while undergoing renovation is difficult as proven by projects at Porter Biosciences Building and JILA. Constructing new science facilities, such as the Jennie Smoly Caruthers Systems Biotechnology Building, allow science to continue until the new facility is built, and then repurposing the vacated facility to a less intense use. This master plan begins this process in its direction. Thus, a greater emphasis on the role of the East Campus is included in this plan over previous planning efforts.

CU-Boulder has a long tradition of master planning as a tool for campus development. The purpose of a campus master plan is to periodically look at trends and needs so that a comprehensive plan for development can be derived to meet those needs. As in the previous campus master plans, this plan will examine needs, trends, and

development potential 20, 30, or even 50 years into the future. It will then take actionable steps toward this vision that can be accomplished over the next ten years.

The previous Campus Master Plan was adopted by the Board of Regents in February 2000 and the Colorado Commission on Higher Education in March 2001. It covered the planning period from 1998 to 2008. It has guided campus development through a period of rapid growth that matched the growth of the campus during the 1960s. During this period, enrollment grew approximately 13.5 percent, which exceeded the anticipated 7.2 percent listed as the mid-line enrollment prediction. Research expenditures had been growing at approximately 4.6 percent per year in the previous planning cycle, and would have yielded a growth of 56 percent over the ten-year planning period. But CU-Boulder greatly exceeded these expectations with growth of nearly 62 percent. This trend continued with 2009 being one of the most productive years on record for research grants. Employment, which was expected to grow to match enrollment and research growth, fell between 2001 and 2009 by 300 staff as economic recessions in 2003 and 2008 forced cutbacks across campus.

New facilities constructed between 2000 and 2010 included:

- Eaton Humanities Building (2000)
- Environmental Health and Safety Center, Phase II (2000)
- Discovery Learning Center (2002)
- UMC Addition (2002)
- Bear Creek Apartments at Williams Village (2003)
- Folsom Stadium Club Seats and Skyboxes (2003)
- Bear Creek Commons at Williams Village (2004)
- CASA Addition (2004)
- Moores-Collins Family Lodge at the Mountain Research Station (2004)
- ATLAS Center (2006)
- Wolf Law Building (2006)
- LASP Space Technology Center Addition (2006)
- Air-Supported Practice Structure (2007)
- Koelbel Building Addition and Renovation for the Leeds School of Business (2007)
- Police and Parking Services Center Addition (2007)
- Soccer Locker Room Building (2008)
- Visual Arts Complex (2010)
- Center for Community (2010)
- Institute of Behavioral Science (2010)

Four of these facilities were funded through student fees (ATLAS, Wolf Law, Koelbel, and Visual Arts) when the state of Colorado was unable to fund capital construction after the recession of 2003–04.

Significant renovations of existing buildings occurred during this period, which include:

- Armory Renovations for the School of Journalism and Mass Communications (2000)
- Campus ADA Accessibility Improvements (2000)

- Ekeley Science Building East Wing Renovations (2000)
- Bruce Curtis Building for Museum Collections (2002)
- Farrand Hall Dining Center (2002)
- Libby Hall Dining Center (2003)
- Porter Biosciences Renovation (2003)
- Institute for Behavioral Genetics Renovation (2004)
- Outdoor Recreation Facilities Improvements (2007)
- Sewell Hall Dining Center (2007)
- Arnett Hall Renovation (2008)
- Andrews Hall Renovation (2009)
- Coors Events Center Renovation for Basketball Offices (2009)
- Norlin Library Information Commons (2010)
- Buckingham Hall Renovation (2010)

During this period, the university acquired the Center for Innovation and Creativity (CINC) in 2003 and the Sybase Building in 2010. Two building were demolished—Hunter Sciences Building in 2000 and the Sibell Wolle Fine Arts Building in 2008.

In spite of all this growth, certain elements were not addressed during the planning period. The 2001 Campus Master Plan proposed addressing faculty/staff housing east of Bear Canyon Creek at Williams Village and dealing with obsolete family housing north of Boulder Creek. An addition to the Koenig Alumni Center was proposed but abandoned. New facilities for Museum Research on the East Campus, a Fieldhouse Complex near the Stadium, an addition to the Duane Physical Sciences Complex, and a research building in Grandview Terrace were studied but did not move forward.

As the planning period closes on the 2001 Campus Master Plan, the economy is mired in recession again and the availability of funding for capital construction is questionable. Yet the university continues to be in demand by students and the research endeavors continue to expand. The vision of the Flagship 2030 Strategic Plan will take the university in new directions that are described in this plan, built upon the solid foundations of prior planning efforts

B. Enrollment

Student enrollment is the principal basis for determining the educational facilities needs identified within this decade-long plan. This section reviews CU-Boulder’s enrollment goals, provides a brief enrollment history, projects enrollment for the future, and explains how the projections were derived.

1. Enrollment Goals

The Flagship 2030 Strategic Plan confirmed the expectation that the university will continue the same modest enrollment growth rate that it has maintained over the past 25 years. The 2030 expectations were modified slightly in 2010 to incorporate increased enrollment of international students. Under the revised model, the university will have about 2,900 more students in 2020 and 5,000 more students in 2030 than it does in 2010. Targeted midpoints are total enrollment of 32,797 students by the year 2020 and 34,951 students by 2030. These targets include degree and award-seeking students with state-reportable hours only, and exclude non-degree students in continuing education only and study abroad enrollees. Enrollment characteristics include increasing graduate student enrollment and moving from 1,368 international students to 3,000 by 2016.

As a comprehensive research university, it is believed that CU-Boulder must help ensure a robust pool of PhD and master's degree students from whose ranks the leaders of tomorrow will emerge. To address this need, the strategic plan called for enhanced graduate education and an increase in the number of graduate students to approximately 20 percent of the total student population. Implementation of this goal over the coming years is estimated to increase the total graduate student body to midpoints of 6,281 students by 2020 and 7,550 by 2030. Graduate enrollment is expected to be increased and then sustained by strengthening recruiting efforts and enhancing graduate student incentives. Graduate degree programs will be re-examined in order to find ways of encouraging non-traditional enrollment, coupled with more effective approaches to graduate education. The 2030 Graduate Education Task Force recommended a two-fold approach: first, improving graduate student support by increasing the standard stipend rate and funds available for graduate fellowships, and secondly, designing programs such as BA/MA programs, professional master's, new master's and PhD degree programs, interdisciplinary studies, accelerated PhD programs, and post-doctorate programs to stimulate enrollment.

Other campus strategic planning goals related to enrollment include maintaining access to qualified students wishing to enroll, regardless of socioeconomic class. To do this the university will enhance student financial support, increase both merit- and need-based financial aid, and continue to build a diverse student body that is representative of the state of Colorado and the world today and tomorrow. The university has set a goal to foster a supportive, more inclusive community for all.

Flagship 2030 Strategic Plan goals related to enrollment also included those goals believed to be critical to maintain a high quality educational experience, such as the desire to maintain faculty numbers relative to enrollment. Starting in 2007, the campus began to

address the strategic plan goal of adding at least 300 new tenure-track faculty members. The aim is to help improve undergraduate and graduate education and to make progress toward achieving and maintaining a tenure-track faculty-to-student ratio comparable to public research university peers. Today, the campus is about one-quarter of the way toward reaching this goal.

As resources allow, the Flagship 2030 goal to expand outreach and enrollment opportunities throughout the state, community, and to graduates will be addressed. The 2030 planners envisioned the expansion of lifelong learning opportunities as an extension of a CU-Boulder degree, to provide a broad spectrum of educational options, including "just-in-time" skill upgrades and career retooling for alumni, professionals, and the community. The campus may invest in rethinking the structure and purpose of traditional continuing education programs given the speed of change in most professions and examine the potential of real-time "virtual learning environments" and nontraditional scheduling, as well as distance-learning opportunities made possible by technological advances. While enrollment of this nature may have some facilities implications, it will not be accounted for in projections provided in the table or graphics below.

2. Enrollment History and Planning

Exhibit I-B-1 illustrates the most recent 40 years of campus enrollment growth, which was in the range of 9,500 students from 1970 to 2010. Four decades of growth began with 20,658 students and peaked with 30,196 headcount students. While the numbers reveal some peaks and valleys, the campus average growth rate during this period of time was steady at just under 1.0 percent per year.

Several factors influence the volume and make-up of student enrollment at the state's flagship campus. The first factor is the size of the freshman class, which is related to the number of high school graduates in the state. This factor has historically driven the steady, measured growth in the number of students on the campus. Over 80 percent of campus enrollment is undergraduate enrollment. Over 70 percent of undergraduates enter as freshmen, and over 80 percent of new undergraduates enter within two years of graduating from high school. Exhibit I-B-2 provides actual figures for the growth of high school graduates between the year 2000 and 2010 and projects figures through the year 2030. The Boulder campus has traditionally enrolled between 5 and 7 percent of Colorado high school graduates. The increase in the number of high school graduates played an important role in the growth of the campus over the last master planning period. Looking to the future, the annual growth rate in graduates is expected to be relatively flat until the year 2016, when the volume of graduates is expected to again be on the increase.

Exhibit I-B-1: Fall Headcount Enrollment—CU-Boulder, 1970–2010

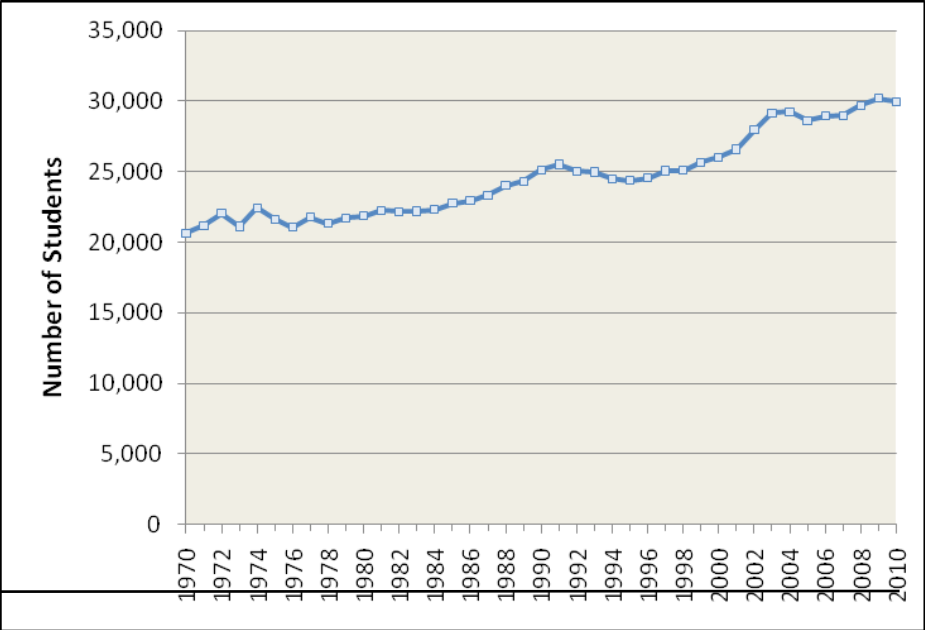
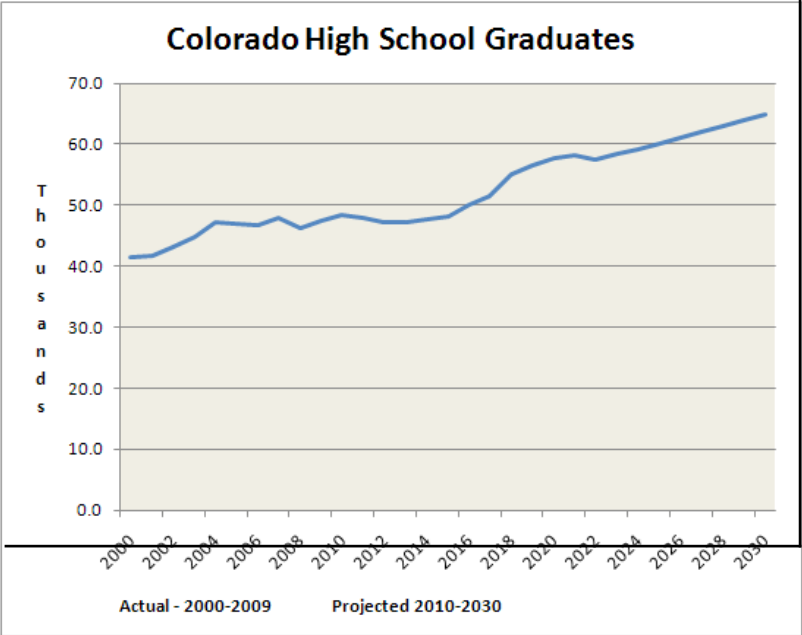


Exhibit I-B-2: Colorado High School Graduates 2000 to 2030



Source: Western Interstate Commission for Higher Education

Another factor having influence on total campus enrollment is the percentage of residents compared to non-residents. This is a critical factor in future enrollment planning as well, as it determines revenue for the campus. Non-resident enrollment subsidizes resident enrollment since tuition is higher for non-residents. Non-residents also play an important role in providing diversity of backgrounds, interests, and points-of-view for a broader educational experience.

CU-Boulder is classified by the state of Colorado in the “highly selective” admissions tier, relative to other Colorado institutions. In 2010, around 80 percent of both resident and non-resident applicants were admitted to the campus for fall semester.

According to Integrated Postsecondary Education Data System (IPEDS) produced for spring 2009, CU-Boulder’s graduation rate of 67 percent is about average for public research institutions enrolling freshmen with similar academic qualifications.

3. Enrollment Scenarios

The University of Colorado Boulder is committed to accommodating the educational needs of Colorado students while providing undergraduate, graduate, and professional education of the highest quality. Campus scenarios for the future take into account projected growth in the number of Colorado high school graduates.

In developing enrollment scenarios, figures are inherently part prediction, and part choice. Predictions take into account the behaviors of high school graduates, transfers, new graduate level students, and their families; the state, with policies on funding, tuition, aid, and admissions; the public, with reactions to CU and to state policies; and the institution itself, with admittance rates, financial aid, recruiting, and capacity limits.

Additional factors may influence enrollment in the ten-year time horizon. The university’s president recently announced guaranteed admission to one of CU’s three campuses, to any student requesting transfer from any of Colorado’s 13 community colleges, to any arts and sciences program, if they have completed 30 semester hours and earned at least a 2.7 grade-point average. A total of 135,000 students are currently enrolled in the state’s community colleges. The action is intended to help provide a competitive, well-educated workforce in the state.

The scenarios detailed in Exhibit I-B-3 represent CU-Boulder’s combination of choices and predictions. The student headcount projected for fall 2010 was consistent with expectations outlined in the Flagship 2030 Strategic Plan.

Three scenarios are shown: midpoint, high, and low. In the midpoint estimate, enrollment increases to 31,040 by fall 2013, with an increasing proportion of

graduate and international students, to 32,002 by 2016. Increased numbers of international students are predicted to be about half undergraduate and half graduate. Overall, the projected midpoint increase for the decade of the master plan is 2,721 additional students, a growth of 9 percent over 10 years or 0.87 percent per year

The graph below depicts these enrollment scenarios, consistent with the Flagship 2030 Strategic Plan only with international students added to the total estimate by 2016, from initiatives developed after the strategic plan. As in the table above, headcount enrollment data includes degree and licensure-seeking students with state reportable hours. Solid lines are error ranges. Black squares are actual figures.

4. Enrollment Data Considerations

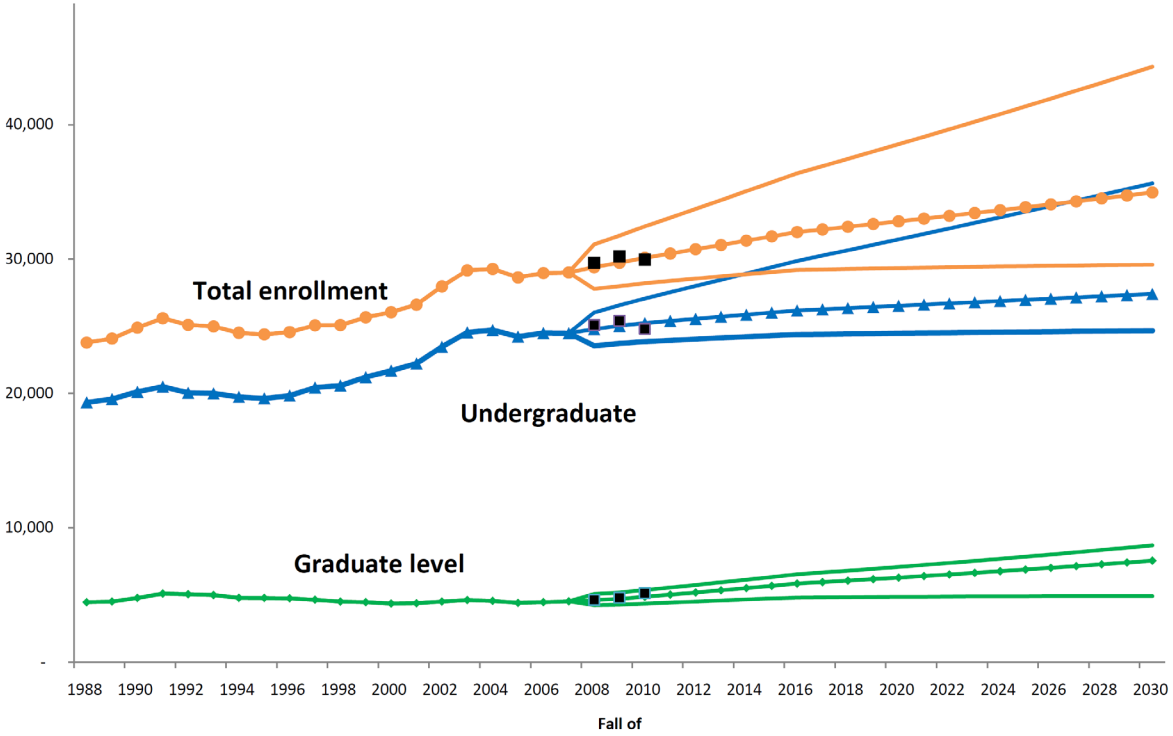
As the listing of low and upper estimates implies, actual enrollment will vary from the midpoint estimate. This is especially true for subgroup data, such as graduate students. For campus planning purposes, the precise figures for each year are rarely used, but rather the more important overall trend is the 9 percent increase over 10 years.

Exhibit I-B-3: Projected Enrollment

Fall Headcount	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Mid estimate											
Undergraduate	25,222	25,388	25,548	25,702	25,856	26,009	26,162	26,251	26,339	26,427	26,516
Graduate	4,854	5,013	5,175	5,338	5,503	5,671	5,840	5,947	6,056	6,168	6,281
Total	30,076	30,402	30,723	31,040	31,359	31,680	32,002	32,198	32,395	32,595	32,797
Low estimate											
Undergraduate	23,846	23,946	24,038	24,125	24,211	24,295	24,378	24,401	24,423	24,445	24,467
Graduate	4,346	4,428	4,507	4,583	4,658	4,730	4,799	4,814	4,829	4,842	4,854
Total	28,193	28,374	28,545	28,709	28,868	29,025	29,178	29,216	29,252	29,287	29,321
Upper estimate											
Undergraduate	27,057	27,523	27,986	28,448	28,912	29,378	29,848	30,248	30,649	31,052	31,458
Graduate	5,361	5,549	5,739	5,933	6,129	6,328	6,530	6,663	6,800	6,939	7,081
Total	32,418	33,072	33,726	34,380	35,040	35,706	36,379	36,911	37,449	37,991	38,539

*Data from Office of Planning, Budget and Analysis, EnrollmentScenarios201010.xlsx posted at <http://www.colorado.edu/pba/records/enrlproj.htm>

Exhibit I-B-4: Enrollment Scenarios: October



Headcount enrollment of degree and licensure-seeking students with state reportable hours. Based on Flagship 2030 enrollment scenarios, with 900 students added to total by 2016 from international initiatives developed after Flagship 2030. Solid lines are error ranges. Black squares are actuals. PBA: L:\ir\emgt\datilib. EnrollmentScenarios201010.xls. Posted at <http://www.colorado.edu/pba/records/enrlproj.htm>

C. Sponsored Research

Research is integral to CU-Boulder’s mission as a comprehensive university that leads in innovation, creativity, discovery, and dissemination of knowledge. Undergraduate, graduate, and postdoctoral student participation in research greatly facilitates participatory learning. A lifelong commitment to creative work also enables faculty members to be effective and enthusiastic teachers who impart both traditional and newly discovered knowledge to students and colleagues. In conducting research, the faculty, research staff, and students all have the opportunity to contribute to the ongoing advancement of learning and the development of knowledge. Furthermore, campus research participants transfer information to many sectors of society through publications, performances, exhibitions, lectures, workshops, outreach activities, development of patents and licenses, and technology transfer. These efforts are essential to the economic and social well-being of the state and nation.

Contributions to the advancement of knowledge are made in both externally funded (sponsored) research and internally funded (unsponsored) research programs. Student enrollment and sponsored research are the impetuses for growth considered in this master plan.

1. Sponsored Research Goals

The University of Colorado Boulder has established aspirations for its research activities that can be summarized as follows:

- Engage the student population in the discovery and creation of new knowledge.
- Maintain and enhance the richness of undergraduate, graduate, and postdoctoral training.
- Maintain and improve CU-Boulder’s position as a premier research university.
- Maintain and enhance CU-Boulder’s status as the flagship campus of the CU system and the premier university in the Rocky Mountain West.
- Continue to improve CU-Boulder’s national and international reputation.

There is a need to continue to recruit and retain outstanding faculty to maintain excellence in research, attract increased funding, and attract top graduate students and postdoctoral fellows. At the forefront of their research fields, faculty provide a rich learning experience for undergraduate and graduate students. They bring unique understanding and insights to the classroom. These individuals provide a rich learning experience because of their own contributions to research and scholarship and their deep understanding of work done by others. They not only disseminate knowledge but also teach students how to become continuous learners by mentoring them in independent research projects.

The students benefit in many ways by involvement in research. They create new knowledge and they develop skills that would not be transmitted in classroom settings. Critical thinking is also improved by research experience. Practical experience in writing and speaking about research improves students’ communications skills.

2. Sponsored Research History

CU-Boulder’s faculty has been very successful in attracting sponsored research funding. Extramural contracts and grants increased from \$258 million in 2005 to \$454 million in 2010.

Significant increases have been realized in recent years. Year 2006 awards to the Boulder campus amounted to \$256 million, and increased for 2007 to \$266 million, followed by annual increases in 2008 to \$280, in 2009 to \$340 and finally, in 2010 to \$454.4 million. This rate of success is well above the national research funding growth rate.

Sponsored research funding has achieved this success because of a creative and entrepreneurial faculty and because of the ways in which research has been institutionalized on campus. In conjunction with individual faculty efforts and departmental efforts, CU-Boulder has a large number of institutes and centers, such as JILA, CIRES, and RASEI, which have established ongoing relationships with federal agencies such as NIST, NOAA, and NREL. The interdisciplinary work of institutes and centers draws talent from several fields as needed to address research concerns. These institutes and centers are able to systematically assist faculty and students to identify research interests, obtain funding, conduct the research, and communicate the results.

Increases in sponsored research award dollars, as well as the goal of providing more experiential learning opportunities for students, drive the need for new or renovated research laboratory and office space. The availability of high-quality research space is a critical consideration in competing for new grants and contracts, and in recruiting and retaining the outstanding faculty and researchers who are responsible for conducting the research.

From the 1960s to the present, CU-Boulder invested in facilities for several types of sciences, notably in engineering, atmospheric and space sciences, and biochemistry. The campus and community have benefited from these investments as they have attracted additional extramural research funding.

Some of the growth in research has been accommodated in research facilities that have been extensively renovated as a result of new, sponsored research projects. But the increase in research facilities space has not kept pace with the demand in the most recent years. Substantial deficits of space are projected in the campus space needs analysis for the future, approximately 602,945 ASF for 2020 and 966,255 ASF for 2030. This analysis can be viewed in Section IV.A.

3. Sponsored Research Projections

Research at CU-Boulder depends heavily on federal funding. Approximately 85 percent of the campus’s research funding comes directly or indirectly from federal sources. Federal funding is expected to continue to increase, although it is projected that research awards in FY2011 may be in the range of \$400 million due to reduction of the American Recovery and Reinvestment Act (ARRA) stimulus funding. Based on past experience, it seems appropriate to project that the growth in federal dollars to support CU-Boulder research will continue to be robust. Annual increases in sponsored research awards are expected to range between 3 and 5 percent throughout the master planning period of 10 years after leveling off in the midrange between 2007 and 2010 figures.

In turn, the growth rate for research facilities should keep pace with awards to maintain the campus’s ability to compete for award funding. Between the square footage inventory of fall 1997 and fall 2009, research space only grew from 523,747 ASF to 533,862, by only 1.9 percent. Newly funded construction of 111,532 ASF for research increases the 1997 to 2011 growth factor to 23 percent. This Campus Master Plan will identify additional research facilities to address the remaining gap of 602,945 ASF of projected need for 2020.

A number of factors contribute to the need for more research space. Several research operations are at present separated into dispersed facilities, creating inefficiencies in both operations and use of space. Consolidating these research operations through reallocation of space is generally not feasible, given existing building configurations, thus the need for new construction is greater than the data would otherwise suggest. Space vacated through moves to newly built space could create several options: reallocating space to other operations, terminating leases of off-campus space, and demolishing structures that now house research but that are outdated or in poor condition. Additional and increased collaboration with federal labs also require increased laboratory and office space.

Within this 10-year planning period, a substantial increase in laboratory, office, and support space is planned. The building plan in Section V.A. will identify new research facilities under consideration for construction.

Additional space should be suitable to the specific research purpose yet be flexible enough to meet ever-changing needs. It must meet building codes and other applicable requirements. Research funding agencies often require specific space standards in order for the specific research to be funded. In order to recruit and retain the best faculty, and maintain high-quality student participatory learning opportunities, the university must also provide the infrastructure for them to conduct their research.

Increased research funding drives the need for more research space, even when the number of tenure-track faculty remains constant. Additional space should also be provided so that institutes can accept some of the funded new activities that are competing to join them. The number and abilities of faculty are a limiting factor in research growth, and the university must constantly recruit creative new faculty and replace retiring faculty.

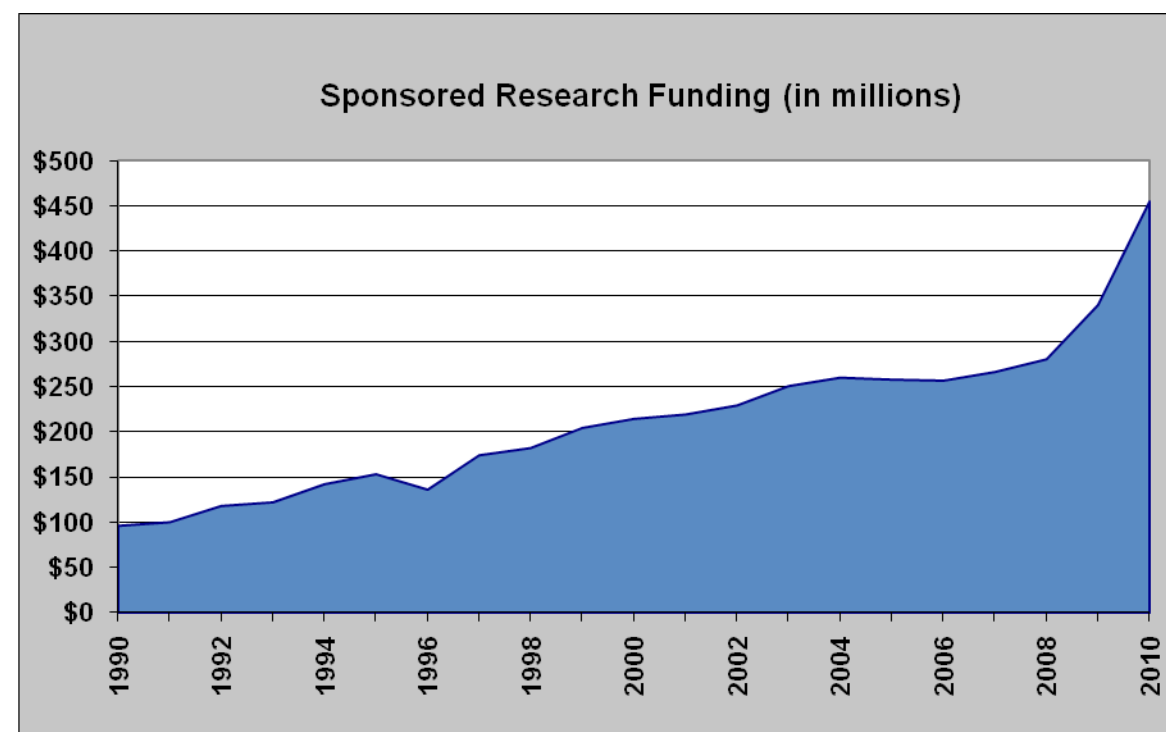
4. Sponsored Research Data Considerations

As previously illustrated in Exhibit I.C.1., a substantial portion (34.4 percent) of total CU-Boulder revenue derives from contracts, grants, and gifts, while another 6.2 percent comes from research indirect cost recovery (ICR) funds.

This master plan proposes that the East Campus will be built out over 50 years to eventually accommodate four million gross square feet of space. Available property will be primarily developed for expansion of programs in the five primary areas: life sciences, environmental sciences, energy, atmospheric and space sciences, and computational sciences. State, federal, and private partnerships will be pursued to integrate academic-research clusters.

A comprehensive study of research space needs for each individual department, center, and institute is beyond the overall space assessment in this plan and would be a major undertaking, but would give a more accurate picture of what research space is needed and provide a measure of the urgency of the need. Such a study would need to assess the likely decreases or increases in grant funding, due to changes in funding available and each unit’s competitiveness in the national marketplace.

**Exhibit I.C.1: Sponsored
Research Funding**



D. Employment

The University of Colorado Boulder offers more than 3,400 different courses in over 150 fields of study. To provide these courses and support student learning, and meet state research and public service missions as well, CU-Boulder employs approximately 7,260 faculty and staff members. Faculty members include nationally and internationally recognized scholars with many academic honors and awards. CU-Boulder faculty members were awarded the 1998 Nobel Prize in chemistry, the 2001 and 2005 Nobel Prize in physics, and shared the 2007 Nobel Peace Prize. It is this human infrastructure that makes CU-Boulder's many accomplishments possible.

Demands for this amount of faculty and staff to support the campus places pressures on the campus to provide appropriate facilities, infrastructure, and equipment for them to work effectively. In other words, the need for land and buildings is not only a function of changes in student enrollment. Increasing the quality of instructional programs often requires more space and equipment to support faculty and staff efforts. The quality of student life is another factor in assessing the need for additional land and facilities. Generating knowledge with the use of high-end technology creates additional demands for space for staff and supporting equipment. And, as research programs grow, so do the number of research associates and support staff and, consequently, their space and equipment.

Support services staffing (e.g., payroll and accounting) needs are also generated by the steady increase in research. At CU-Boulder, the critical role that research plays in integrated teaching and learning presents a strong case for adequately providing staff to support research and insuring that facilities will also not be the limiting factor. This section reviews CU-Boulder's employment goals, provides a brief employment history, projects employment for 10 years, and explains how the projections were derived and how they should be used.

1. Employment in Flagship 2030 Strategic Plan

The university's mission to advance and impart knowledge can only be achieved with the support of dedicated faculty and staff. The primary goal of the campus is to produce graduates with critical thinking skills, in-depth knowledge of their specialty, and the capacity for lifelong learning, plus contributions to knowledge and public service. The first Flagship 2030 Strategic Plan core initiative, which details enhancing education and scholarship, states that in order to offer a high-quality educational experience and foster research excellence, CU-Boulder will increase the size and enhance the quality of faculty. The 2007 goal was established to add at least 300 new tenure-track faculty members within 10 years. The aim is to make substantial progress toward achieving a tenure-track faculty-to-student ratio comparable to public research university peers, and then to maintain this ratio

over time. The goal detailed the primary distribution of these faculty among the core disciplines of humanities, the arts, the sciences, social sciences, engineering, business, education, and journalism, and secondarily in distinctive areas in emerging interdisciplinary fields such as biotechnology, sustainable and renewable energy, geosciences, environmental studies, technology, entrepreneurship, and the American West.

The fifth Flagship 2030 Strategic Plan core initiative describes how a talented and diverse staff is essential to the administration and operation of a major research university playing a critical role in the success of faculty engaged in teaching, outreach and, research. Staff are important partners in the development and provision of innovative classroom pedagogies. Student satisfaction and success is closely related to high-quality staff support for academic advising, career counseling, and other important student development activities. All areas of the university rely heavily on effective staff support. In the most recent decade, levels of staff employment have not kept pace with growth in faculty, student enrollment, and volume of research. The strategic core initiative to support the mission of the campus proposes to increase staff employment, which will help to ensure proper levels of support for the campus's aspirations in teaching, research and creative work, and service.

2. Employment History

CU-Boulder is one of the largest employers in Boulder County, employing approximately 7,260 employees in fall 2010. Of the total number of employees, approximately 30 percent are tenured and tenure-track faculty and other instructional employees, 24 percent are academic non-instructional or research, 34 percent are state classified staff (state civil service) employees, and 11 percent are unclassified and exempt from the state classified system. Classified staff are employees in the state of Colorado personnel system. The total number of faculty and staff employees has increased less than two percent since 2001.

For details see <http://www.colorado.edu/pba/facstaff/AllYearsEmployees.xlsx>

For definitions used in faculty and staff counts see

<http://www.colorado.edu/pba/facstaff/ShowCats.xlsx>.

A 2008 examination of CU-Boulder staffing levels relative to those of other AAU public institutions, given student FTE enrollment, revealed that total staffing is 24 percent below peer institutions. Non-professional staff, including technical, clerical, service, and maintenance staff was 36 percent below expected levels, given numbers of students and amount of funded research. For tenure and tenure track faculty, the total staffing is 14 percent below the expected numbers compared to CU-Boulder's peers. And finally, for professional staff, which includes instructional and research staff not on tenure

track (including administrators, librarians, and other similar classifications), the group had staffing levels closer to that of peer institutions. This information was derived from fall 2006 data from the Integrated Postsecondary Education Data System of the U.S. Department of Education. The comparison was to 31 AAU public universities. For more information, see <http://www.colorado.edu/pba/peer/staffing08.htm>.

Over the last 10 years, non-instructional research and unclassified positions have increased in number. Research employees now comprise about 24 percent of CU-Boulder employees, compared to 21 percent in 2001, representing an increase in the level of total research employment at CU-Boulder. Unclassified positions comprise 11 percent of total campus employees in 2010, compared to 6 percent in 2001. Exhibit I-D-1 provides the fall headcount figures for all CU-Boulder employees from 2001 to 2010. These figures do not include student employees nor do they include people employed by organizations affiliated with CU or agencies that rent space from CU-Boulder.

Instructional. The total number of instructional positions, including part-time, has decreased by 188 employees from 2,395 in 2001 to 2,207 in 2010, while a subset of that figure, tenure and tenure-track faculty, has increased by 114 employees from 1,029 in 2001 to 1,143 in fall 2010. The number of instructional and research positions increased a slight (0.34 percent) in annual percentage terms from 2002 to 2010 (compounded growth over nine interval periods). Faculty-to-student ratios have increased slightly from 25.8 in 2001 to 26.2 in 2010. This is a measure of the number of tenured and tenure-track faculty per fall semester Main Campus degree-seeking student headcount.

Non-Instructional / Research. This category is comprised of mainly research faculty—research associates and professional research associates, and represents the second largest increase over the past 10 years of the four categories. The 248 employee increase is a result of the tremendous success in sponsored research funding that CU-Boulder has achieved.

Classified employees have been under the jurisdiction of the state civil service system since 1974, and are managed by the State Department of Personnel and Administration, Division of Human Resources. Classified staff employment has decreased by 300 employees from 2001 to 2010. The Boulder Campus employed approximately 2,778 classified employees in 2001, and as of 2010, currently employs approximately 2,478 classified employees. The number of classified employees has fluctuated annually over the course of the last decade in response to budget, enrollment and support services needs, and the conversion of some classified positions to positions exempted from the classified system.

Exempt professional positions vary in nature from directors and mid-level managers to professional positions

in academic support, professional positions primarily funded through student fees, and grant funded positions. These positions are excluded from the state civil service system. The number of these positions has grown from 429 in 2001 to approximately 802 in 2010. The growth in exempt professional positions can be attributed in large part to statutory changes in 2004 that required the exemptions of some positions from the civil service system.



3. Employment Projections

Fulfillment of the state’s statutory role and mission establishes a continuing need for additional faculty, teaching assistants, part-time graduate instructors, and research-related personnel. Realization of the 2030 strategic goal to add 300 tenure and tenure-track faculty and related support staff will drive a need for office and support space and equipment. The projected increase of 3 to 5 percent annually in sponsored research funding will also drive the need for additional employees.

Exhibit I-D-2 reveals 10-year projections of the number of Boulder campus fall headcount employees if strategic goals for hiring additional tenure and tenure track faculty and associated research and support staff are realized. The figures do not include student employees nor do they include people employed by organizations affiliated with CU or agencies that rent space from the university. The actual number of people hired will depend on further management and resource decisions over the next decade. The projections include 647 additional employees to support the campus by the fall of 2020, an 8.9 percent overall increase from 2010 actual employment figures. The overall average annual increase in total employment is 0.9 percent.

At a more detailed level, the most significant amount of employment growth is expected to be due to the projected increase in sponsored research funding and staffing. The projections allow for an average annual increase of 1.8 percent in non-instructional and research employees, which is considerable growth compared to the projected average annual increase of instructional faculty at 0.7 percent, and classified and non-classified staff at 0.4 percent. In developing employment projections for CU-Boulder, analysis revealed that annually projected increases in employment correlate similarly to midrange annual average student enrollment growth, also 0.9 percent.

4. Employment Data Considerations

Significant increases were realized in research-related awards in the final years of the last master planning period after several years of stabilizing in the range between \$250 and \$275 million. The level of employment related to these awards was responsive first to the stabilization of awards, and then increased by 2010. The sharp increase in federal funding is attributed primarily to American Recovery and Reinvestment Act (ARRA) economic stimulus funding. A return to the \$400 million dollar level of funding is expected, upon completion of ARRA federal funding. Funding support in the range of an additional 3 to 5 percent annually is expected for the master planning period. Non-instructional and research-related employment levels have been depicted here to support these funding levels. Employment projections may vary several percentage points depending on a variety of factors that will influence actual faculty and

staff counts. Factors not quantified in this analysis include the utilization of alternate work arrangements (e.g., telecommuting, job sharing amongst staff), fiscal resources and constraints, economic variability of markets dependent on research and technology advancement, and changes in laws or enrollment policies. These projections are not intended for use to justify future positions.

Employment data also does not reflect the number of employees that are affiliated with the university but are not direct employees of the university (e.g., JILA fellows appointed by NIST). A rough estimate of these employees may total 160 to 170 people. Another 200 to 250 people may be employed by agencies that rent space from the university and have no affiliation with CU-Boulder (e.g., USGS). These people are not included in the space needs and other analyses; however these people do place demands on space and supporting infrastructure like parking. To this extent, additional capacity may be needed in university facilities to support the needs of these unaccounted for users.

Exhibit I-D-1: CU-Boulder
Employees, 2001–2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Instructional	2,395	2,233	2,141	2,164	2,376	2,451	2,644	2,279	2,245	2,207
Non-Instructional/ Research	1,525	1,461	1,518	1,591	1,556	1,557	1,153	1,182	1,326	1,773
Classified Staff	2,778	2,945	2,804	2,784	2,599	2,459	2,505	2,513	2,513	2,478
Unclassified Staff	429	478	474	487	519	576	600	676	743	802
Total	7,127	7,117	6,937	7,026	7,050	7,043	6,902	6,650	6,827	7,260

Exhibit I-D-2: Ten-Year
Projections of
Boulder Campus Employees
(headcount)

	2010*	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Instructional	2,207	2,225	2,243	2,261	2,279	2,297	2,315	2,333	2,351	2,369	2,373
Non-Instructional/ Research	1,773	1,808	1,842	1,877	1,912	1,947	1,981	2,016	2,051	2,085	2,120
Classified / Unclassified Staff	3,280	3,293	3,306	3,320	3,333	3,346	3,360	3,373	3,386	3,400	3,414
Total	7,260	7,326	7,392	7,458	7,524	7,590	7,656	7,722	7,788	7,854	7,907

*Actual employment

Source: CU-Boulder Office of Planning, Budget, and Analysis: <http://www.colorado.edu/pba/facstaff/AllYearsEmployees.xlsx>. This includes part-time employees and employees funded from all sources including sponsored research.