LRDP RESEARCH SUBCOMMITTEE
FINAL RECOMMENDATIONS

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EXECUTIVE SUMMARY

UCSF is a world leader in biological, biomedical, clinical and health policy research. During the next 15 years, our goal is to continue to lead the way in these broad areas of research, inspiring the next generation of researchers and developing foundational expertise in emerging disciplines. To achieve these goals we maintain our commitment to excellence, innovation, and collaboration, and to a strategic and deliberate approach to accomplishing them. Science, medicine and health care delivery are rapidly changing, which will create new opportunities for UCSF. However, research funding projections and the uncertain economy could underlie threats to our success. The LRDP Subcommittee on Research recognizes our strengths and challenges and herein provides recommendations for enabling excellence in research at UCSF with a focus on maximizing faculty success, optimizing research space planning and sustainable funding, aligning program proximities, and aggressively pursuing new funding opportunities and resources.

We offer specific recommendations in three broad areas:

- **Creating an environment that enables competitive faculty recruitment and retention and facilitates faculty productivity.** Among the best ways to maintain excellence is to invest in UCSF’s most valuable resource: its faculty. We recommend that a UCSF-wide fund be established to support UCSF faculty recruitment, faculty retention, and Enabling Technology Centers (ETCs), and we suggest ways to optimize space allocation to increase faculty productivity and success. Since ETCs are an essential component of faculty research programs, UCSF should invest in their central management.

- **Using existing space more efficiently, aligning research and clinical teams and themes, and strategically planning for new space.** We recommend, under the aegis of a new Campus Research Space Planning committee, that an inventory of research space, administrative support and aligned clinical and educational programs be conducted; that existing space be used more efficiently to enhance collaborations and minimize the need for new research buildings. However, new buildings may be required to accommodate new areas of science, align programs and philanthropic opportunities. This could include planning for ongoing financial support for operating costs, faculty recruitment/startup, and research funding for self-sustaining paradigms.

- **Aggressively pursuing new funding opportunities and resources.** We have the opportunity to streamline our research enterprise while maximizing proximities of programs and cores facilities (Enabling Technology Centers). We must address our needs, resources, and resource limitations and pursue new funding sources. We recommend steps to position faculty to capture a broader range of federal, industry, philanthropic and nonprofit funding, and we suggest ways to identify and maximize UC-wide and UCSF-specific collaborations and minimize barriers to innovative industry collaborations.

To plan for future research growth, planning committees need a better understanding of how UCOP and the clinical enterprise relate to UCSF’s research enterprise. Thus, we recommend that the University increase transparency in the way funds are transferred from UCOP and the Medical Center to the research enterprise. The University should also identify and support opportunities to use research to support and advance the clinical enterprise.
OUR VISION: WHO WE ARE AND WHERE WE ARE GOING

UCSF is known worldwide for its leadership in fundamental biomedical research, research in human biology, health and disease, and health policy and health systems research. During the next fifteen years, we envision UCSF continuing to lead the way in these broad areas of research, inspiring the next generation of researchers, and developing foundational expertise in emerging disciplines. To expand our vibrant research enterprise for the future, we offer two specific recommendations:

Recommendation #1: Build on UCSF’s core strengths in basic science, human biology, clinical/translational research in human health, health policy, and health systems research.

UCSF is well positioned to capitalize on its existing breadth and depth of expertise in biological and biomedical research. By building on our core strengths, faculty and staff should advance biomedical science and patient-oriented research, train the next generation of researchers, and advance human health and prevent disease worldwide. In turn, UCSF will maintain its reputation for excellence and its position in the top tier of biomedical research training and funding. We offer the following core area examples:

- **Basic Research:** Some of the UCSF’s most important contributions to human health, including the foundational research for Genentech, have come from pioneering research in fundamental biological processes. We anticipate that strong opportunities of molecular, genetic and systems approaches using a variety of model systems and generating voluminous amounts of data will persist and will favor collaborative efforts from proven leaders such as UCSF, despite the concern that funding for basic research may decelerate or contract during the next fifteen years. Examples of our core strengths include physical biosciences, systems and synthetic biology, cell biology, cancer biology, pharmacology, developmental biology, neuroscience, stem cell biology, immunology/inflammation, reproductive biology, protein engineering; chemical biology, genomics and molecular medicine.

- **Research on Human Biology, Health and Disease:** UCSF is a leader in human-focused research, and we should position ourselves to continue to promote transdisciplinary research and derive attendant funding opportunities to enable and sustain these. Examples of our core strengths include: neuroscience, aging, metabolism, bio-behavioral science, genetics/genomics, transplantation/immunology, HIV biology and epidemiology, in utero surgical therapies, cardiovascular/pulmonary biology, clinical research utilizing pharmacologic, biologic, surgical and imaging approaches, in e.g., cancer, HIV, women’s health, and diabetes, and also health systems and health policy research. Patient-oriented research and community involvement are essential to the clinical research enterprise and likely will continue during the next decade. We have huge strengths in these areas and should capitalize on these (and other) funding opportunities for our research and related training programs.

Recommendation #2: Pursue emerging opportunities in growth areas where UCSF has a strong nucleus.

While it can be difficult to predict the research opportunities of highest promise, several areas stand out as priorities due to their likelihood of growth and a strong existing base in each which
UCSF can use to develop larger initiatives. Many of the research opportunities UCSF chooses to pursue will take the form of campus-wide initiatives that result in new Centers, Institutes, or Departments and/or multi-PI grants and initiatives. We have, therefore, attempted to select a level of research area granularity appropriate for campus-wide initiatives: human genetics/epigenetics, the human microbiome, adult and in utero stem cell therapies, imaging and radiology, personalized medicine, environment, health and disease, computational biology, precision medicine, biomedical computational science, knowledge networks and genome biology, health systems research, health care delivery research, patient-centered outcomes research, health economics research, community partnerships in research, cost-containment in healthcare and industry partnerships in research. For example:

**Biomedical Computational Science**: (ongoing initiative). For the growing pool of basic and clinical researchers and clinicians who work with vast amounts of biological and human data, the rate-limiting step is not generating the data but analyzing it. We propose that UCSF invest in computational biology, from predicting ligand binding to diagnosing disease and assessing risk. Key to our engagement in this area will be a decision about whether to retain distinct outposts of computation in the existing Departments or to form a central computational hub.

- **Knowledge Networks**: As our collective scientific expertise grows, it becomes more complex. Researchers studying different parts of the same problem – e.g., the chemical biology of Hedgehog pathway inhibitors, the developmental biology of limb patterning, and the clinical genetics of basal cell carcinoma – might not be aware of each other’s research. A recent National Academy of Sciences committee co-chaired by our Chancellor suggests a solution to this problem in the form of ‘knowledge networks’. UCSF is well positioned to be a pioneer in creating an early prototype. Such a network would consist of several nodes (people, projects, genes, proteins, small molecules, patient demographics, diagnoses) and edges representing known or predicted connections. Using algorithms similar to the ones that construct maps of social networks and predict movie preferences at Netflix, the knowledge network will enable UCSF researchers to identify key genes or metabolites for their research question, new collaborations that connect a basic research project to a related clinical study, disease risk assessment, informing health policy reform and transitioning health systems delivery. An ultimate goal would also be to develop diagnostics, license IP, and develop novel and targeted therapies for diseases and preventive measures for disease risk and maintain wellness.

- **Healthcare Delivery Systems Research.** Transforming the nation’s healthcare delivery system so it provides safer, higher-quality services to more people at lower cost is a national goal. Patient centered outcomes research (PCOR) and comparative effectiveness research will inform this transformation to ensure it is research driven and evidence based. UCSF’s world-class clinical enterprise, including safety-net and VA systems, provide a strategic advantage for campus-based health services and policy researchers to lead development of this field. We offer the following recommendations:
  - Inventory researchers conducting patient centered outcomes research (PCOR) that includes substantial interaction with patients and healthcare practice. Plan space use so that these PCOR investigators can be co-located or embedded within the clinical enterprise.
Identify and support data infrastructure needs to support PCOR. Ensure development of adequate infrastructure including access to data from electronic medical records, technical support and data sharing arrangements so that UCSF can conduct outstanding PCOR research within and across its diverse clinical enterprise at UCSF Medical Center, UCSF Benioff Children’s Hospital, San Francisco General Hospital and Trauma Center, and the San Francisco VA Medical Center and UC-wide.

Consistent with UCSF’s charter as a public institution, support and enhance our research on healthcare transformation in California as well as research that focuses on enhancing health and healthcare for vulnerable and underserved populations, including Veterans and those who receive care in the safety net.

Consider Centers for Systematic Reviews to support Evidence-Based Medicine recommendations and practice.

CREATE AN ENVIRONMENT THAT ENABLES COMPETITIVE FACULTY RECRUITMENT AND RETENTION AND FACILITATES FACULTY PRODUCTIVITY

Our biggest asset as an institution of higher learning is our faculty and staff. Due to the competitive nature of faculty recruitment and retention, we recommend specific measures to support faculty recruitment, retention and productivity, including a university-wide fund for faculty recruitment and retention, funding and space for Enabling Technology Centers (see below), and steps to optimize space allocation for increased productivity. Additionally, we suggest that UCSF establish a target or ratio for the steady-state number of junior to senior faculty and basic research to clinical research faculty.

Recommendation #3: Establish a UCSF-wide fund for faculty recruitment, faculty retention, faculty success, and Enabling Technology Centers (cores).

Three issues of primary importance to sustaining a thriving research faculty are the recruitment of junior faculty, the retention of mid/senior faculty, and the availability and accessibility of Enabling Technology Centers. This fund would ensure that faculty recruitment/retention and Enabling Technology Centers remain top priorities for UCSF, especially as General State Allocation dollars decelerate and perhaps disappear. We recommend the following to accomplish these goals:

- Re-evaluate the funding levels of endowed chairs and distinguished professorships.
- Strategize and implement a major fundraising campaign for sustainability of faculty and of programs.
- Fund a standing pilot and feasibility fund with competitive review to enable access for researchers to leverage external funding opportunities more effectively.
- Subsidize rates for expensive technologies and expertise that are considered mission critical.
- Fund the following in the Enabling Technology Centers (also see Recommendation #5):
  - Instrumentation equivalent to 30% of annual depreciation of equipment in ETCs (currently estimated $3MM/year) - as full funding or matching funds for grant applications.
  - Biomedical informatics to support storage, access to and analysis of high-level structured data, such as genomics, genetics, and proteomics, and patient-level data from administrative and clinical sources.
- Operational expenses for research and development in the ETCs (innovative applications, technology advances) equivalent to 5% of ETC operating budgets.
- Operational expenses associated with education and training functions in the Enabling Technology Centers equivalent to 5% of recharge activities.

Recommendation #4: Develop ways to optimize the allocation of space so as to increase faculty productivity and success.

A key component of efficient space use (Recommendations #6 and #7) is that space is available when faculty need it (e.g., when a new grant is awarded or a Center is funded). An important corollary is that space allocations should be re-evaluated periodically to ensure that assigned space is allocated equitably across sites and that space is used optimally.

- Define our resources by focusing on people and space, with metrics defined in terms of direct and indirect cost recovery.
  - Consider direct as well as indirect cost recovery so as not to handicap those units that are off-campus and generate lower indirect cost recovery or that focus on training or those with foundation support with low indirect cost recovery rates.
  - Determine current direct and indirect cost recovery per assignable square foot for various faculty subgroups (age, academic series, discipline, and wet/dry lab space). Use these data to establish benchmarks for different types of principal investigators and research. These data will also inform how campus finances vary depending on the type of science.
  - Organized Research Units and Chairs should play a key role in decision-making about how resources are allocated.
  - Mount a UCSF campus-wide program to develop expectations for efficient use of space and to monitor use of internal resources.
  - Add available resources to support knowledge networks.
  - Encourage cross-department and cross-school programs to share research resources.
  - Assure that there is proximity of programs – e.g., co-location of the research programs with the new Children’s, Women’s Specialty, and Cancer Hospitals at Mission Bay.
  - Laurel Heights is home to bio-behavioral sciences and the majority of the research is transdisciplinary. There is a desire for the program to continue to be contiguous and/or located near Parnassus or Mission Bay (to be near Epidemiology and Biostatistics).

- Consider term FTE assignments with periodic review of faculty funding and productivity. This proposal addresses a fundamental issue of how faculty and staff support are derived and sustained and is particularly important with limited state and federal budgets and economic uncertainties. This policy would be grandfathered in so that it would not apply to currently tenured faculty. We recognize that this recommendation is in conflict with the Academic Personnel Manual, but we raise it as a point of discussion because of the economic impact this has on units with regard to utilizing General State Allocation dollars (while available) for others.
Recommendation #5: Invest in central management of the Enabling Technology Centers to increase visibility, improve accessibility, reduce redundancy and implement sound business practices.

Enabling Technology Centers are often duplicated (at different sites and often don’t have the capacity to meet the demand) and could require significant faculty investment of time to direct and carry substantial overhead costs associated with their management and funding. We recommend that specific steps be taken to reward the time investment that faculty make in directing an Enabling Technology Center, and to provide centralized support for needs that are common to multiple Enabling Technology Centers.

- This investment should be evaluated using the same metrics used in Departments. Specific functions should include:
  - Coordinating funding and scientific recharge activities.
  - Facilitating grant writing and new funding opportunities.
  - Developing and maintaining communication (website and networking) tools to provide easy access to Enabling Technology Centers.
  - Stimulation of collaboration with external partners/clients
- Recognize institutional faculty service for Enabling Technology Center Directors and reduce their other service obligations accordingly.
- Creatively enhance promotions for faculty involved in the Enabling Technology Centers.
- Enhance and maintain campus Information Technology infrastructure to allow rapid transfer of large data sets as well as computational centers that support data mining.
- Future plans for Enabling Technology Centers should ideally be located at the sites of the research activities that they support. Given that comparable types of research are performed at the different sites, it is essential that the Cores be accessible across campus sites (e.g. a Transgenic core; an animal behavior Core etc.).

**SPACE: NEW CONSTRUCTION & USING EXISTING SPACE MORE EFFICIENTLY**

During the next fifteen years, it is essential that UCSF’s space supports its goals of excellence in research, education and patient care and that the allocation of space facilitates collaborations and neighborhoods of research themes and teams. Currently, UCSF has space inefficiencies and needs, without a comprehensive strategy for co-locating research, clinical and educational programs, planning and sustaining programs, buildings, and infrastructure, and allocating costs across our research enterprise. UCSF should mount a campus-wide effort to ensure that existing research space is used efficiently and allocated equitably across all sites; and if new buildings are proposed, they must have built-in ongoing financial support. In the absence of self-sustaining business plans, space construction may be constrained through 2030 (excluding the San Francisco VA Medical Center and San Francisco General Hospital). It is essential that current assumptions (in 2012) be re-evaluated periodically for possible modification.

Recommendation #6. Existing space must be used more efficiently and reorganized for optimal utilization and collaborations, with the goal of accommodating up to a 25% increase in faculty size (clinical and research).

The subcommittee is not recommending that our faculty will or should grow by 25% by 2030, but that based on the effective use of the existing physical space available, we should have the capacity to accommodate a 25% growth should it occur. The traditional academic model of allocating space to departments is inefficient. Although to some there appears to be an overall
shortage of space; departmentally controlled spaces can be empty or sparsely occupied. There are currently approximately 100,000 gross square feet of underutilized and vacant space and there is a possibility that a more efficient use of space could yield an additional 100,000 square feet. Urban universities such as Columbia have adopted a space rental policy that has recovered a substantial portion of their space, allowing them to expand without new construction. It follows that a similar “rent” charge model at UCSF could free up underutilized space for other uses (such as Enabling Technology Centers or faculty growth). While space at UCSF has grown considerably over the past 15 years, especially at Mission Bay, the emphasis over the next 15 years should be on reorganizing space so that faculty can grow without the need for new buildings. Some exceptions include computational space for existing wet labs, and space to move people who are currently occupying leased space. As new opportunities arise, there should be flexibility in assessing programmatic, financial and space models.

Recommendation #7. New buildings may be constructed, but require built-in ongoing financial support rendering them self-sustaining in the long term.

We assume that the modest research growth estimated by the schools through 2021 will be accommodated in existing underutilized and vacant space. UCSF should retain its ability to take advantage of opportunities for new space as part of a long-term strategy of the research enterprise and reserve space for unexpected opportunities in science and medicine. From a financial perspective, it should be noted that even if funds can be raised to construct a new building, startup funds for new faculty may be difficult to secure and a building’s future occupants will face an uncertain grant funding climate. Thus, an increase in indirect cost recovery cannot be assured, and efficiencies of existing space utilization are essential.

To accomplish Recommendations #6 and #7 we propose the following:

- The new campus-wide space committee should evaluate all current space and newly proposed buildings to ensure programmatic proximities and consistencies in the UCSF strategic plan. The inventory already performed by the finance office is a good start, but not adequately detailed. The charge to the committee includes:
  - Perform a full inventory of space at UCSF.
    - Inventory its administrative/support infrastructure space and include this in any space allocation policy.
    - The new inventory should capture all space (including rental and leased space) and record the type of research in each space. The inventory should also account for infrastructure and administrative space.
    - The new inventory should consider equitably the San Francisco VA Medical Center, San Francisco General Hospital, Laurel Heights, Parnassus, Mount Zion and Mission Bay.
    - The inventory should consider clinical care space where research occurs. Medical Center space allocated to research (offices, admin, Enabling Technology Center) should be inventoried as “Clinical Research Interface” space.
  - Assure that new construction has built-in ongoing financial support (i.e., self-sustaining in the long term). Ongoing financial support includes:
    - Operating costs for the building, including debt service if part of the building is financed.
- Operating costs for equipment, supplies, and the programs that populate the building.
- Funds for recruiting and supporting the ongoing research of faculty and trainees to be in the building.
  - Identify emerging research opportunities and ensure that they are linked to space and startup funds, including appropriate resources for animal facilities.
  - Assure alignment of basic research space with the clinical research (and points of care) to which it is linked.
  - Provide systematic institutional review to identify new, maintain existing, and phase out obsolete facilities.
  - Generate an algorithm to allow us to properly assess and evaluate space efficiency because assumptions in 2012 may not be applicable to realities of out years.

- The allocation of clinical space should take linked research activities into account, thus the Medical Center should be involved with space allocations. Clinical Research Services (CRS) are embedded in clinical space, which occurs in clinical settings. The current amount of CRS space is estimated at about 23,300 assignable square feet across all sites and could be used more optimally. With the additional CRS space planned at the Mission Bay Hospital, CRS space is not projected to further increase through 2030.

- Adopt the School of Medicine Space Governance Policy and apply its principles across UCSF.

- Space should meet faculty needs while encouraging synergy across programs and departments. Maximize co-localization to link translational bench research and clinical research and clinical programs at all relevant sites.

- Provide dedicated funds for ongoing upkeep of existing space to mitigate breakdowns or obsolescence.

- Minimize leases in a way that centralizes critical functions.
  - For example, we recommend that the Radiology imaging facilities currently located in leased space at China Basin be relocated to campus.
  - Since UCSF Lease Policy indicates that leasing should be in accordance with the LRDP, the objectives for all current and future leases should be fully articulated to ensure programmatic and economic alignment with the LDRP.

- Provide institutional space equivalent to at least 10% of total research space that is dedicated to Enabling Technology Centers.
  - Include biorepositories as a part of the 10% space allocation.
  - This space should not be at the expense of a host department or the directing PI.
  - A central committee should manage Enabling Technology Center space allocation. This space allocation should include dedicated biobanking facilities but not animal space (LARC).
  - Currently, Enabling Technology priorities include bioinformatics, computational sciences, imaging, large scale sequencing, proteomics, small molecule and protein reagent discovery, bioautomation, microfluidics. Priorities should be reexamined in the future to meet any unforeseeable change in needs.
- Revise the current distribution of animal-based research space and devise procedures for its future allocation.
  - Animal Use Committee should consider whether animal use space is being used optimally and consider whether all quarantine space should be moved off-site.
  - Provide additional animal housing space at Parnassus, which cannot currently accommodate any increase in faculty usage.
  - Review barrier facility procedure space and increase appropriately.
  - Provide Biosafety Level (BSL3) procedure and housing suites appropriate for infectious agent research.
  - Provide space for a gnotobiotic (germ-free) facility.
  - Additional large animal housing and procedure space is necessary at both main campuses including space for imaging procedures. Consideration should be given to non-barrier facilities to accommodate multi-modality imaging of animal cohorts.
  - Provide co-location of animal barrier space.
  - LARC estimated that the amount of animal space planned for the next 10 years is adequate; however, there could be unforeseen scenarios that would increase the demand for animal space. Therefore, it is recommended that at least 10% of total research space (consistent with current ratios) be dedicated to animal space through 2030.

AGGRESSIVELY PURSUE NEW FUNDING OPPORTUNITIES AND RESOURCES

UCSF is a global leader in innovation and excellence in research and education in the health sciences and in patient care. We are also visible nationally in health policy research and our faculty hold positions on national and foundation review groups, advisory panels, health policy boards, hold office in their respective professional organizations, and are included in among members of the National Academy of Sciences, the Institute of Medicine and the American Association for the Advancement of Science. Thus, while we are well positioned to continue to advise on biomedical research and health policy for the nation and to lead in research, training and clinical care, our position and goals are threatened by decelerating traditional streams of research funding and economic uncertainties at the State, national and global levels. Numerous opportunities exist to increase the UCSF’s funding, which will require innovative and aggressive approaches and committed financial stewardship. We should capitalize on our strong track record at NIH by advising the federal government to create funding opportunities in our areas of core strength, while increasing our efforts to pursue grant dollars from other federal agencies with an interest in innovative biomedicine (e.g., Defense Advanced Research Projects Agency). We should also mount an aggressive effort to secure funding from industry and philanthropic sources, with an emphasis on taking advantage of our proximity to Silicon Valley entrepreneurs where there are common interests and potential markets. We should also secure new funding sources that will emerge in conjunction with changes in healthcare delivery.

Recommendation #8: Position faculty to capture a broader range of federal, industry, philanthropic and non-profit funding and link knowledge networks when possible and appropriate.

Faculty pursuing new funding streams often face an ‘activation barrier’. UCSF should take specific steps to overcome this barrier and empower its faculty to bring in grants from unfamiliar sources:
Establish a greater lobbying presence in Washington, D.C. to better position NIH and other federal fund opportunities for the Campus.

Develop a database of award opportunities that is easily accessed and used by faculty. The system should include search functions to facilitate the ease of use. Emphasize multidisciplinary, team-science proposals and provide campus support to coordinate the writing and submission of multidisciplinary funding opportunities.

Increase outreach to industry, health care payers, philanthropic donors and venture philanthropy organizations; develop a strategic effort to emphasize recognition of programs and people at the University and acknowledgement and stewardship of our past, current, and potential donors.

Position UCSF to partner with alumni and opportunities in China, India, Brazil, and other emerging research powers or, e.g., the Philippines where there are potential funding opportunities. A good start would be to construct and staff a permanent office in one or more of these emerging research locations.

Faculty development and support require a major commitment on the part of UCSF for this to be high priority and be of benefit of all faculty. This should be included as a philanthropic goal, in parallel with the possible reappraisal of tenure issues.

Recommendation #9: Enhance innovative UCSF-industry collaborations.

Industry collaborations are becoming more common and provide a key revenue stream, especially for projects that require seed funding or are otherwise outside the purview of the NIH. UCSF should work diligently to maximize collaborations with industry:

- Work with the Biomedical Research Acceleration, Integration, and Development (BRAID) Consortium and the UCSF Vice Chancellor of Research to examine and, when necessary, advocate for change in UC policy to enable campuses to capitalize on a broader range of collaboration opportunities.

- Work with faculty to ensure that our collaborative activities with industry are ones that align with the goals of our faculty and support the UC mission.

- Develop an effective outreach plan to educate faculty about disclosing inventions, initiating industry collaborations and working collaboratively with industry. Consult with Chairs, Institutes, Center and Organized Research Unit Directors to identify opportunities for these discussions with faculty.

- Capitalize on new opportunities to engage in joint research projects with industry.
  - Develop a strategy for increasing business development activities, ensure that these activities can be efficiently executed and managed, and track their progress to monitor the satisfaction of both parties.
  - Pilot the use of social media enterprise platforms to guide a transformation in their application for research collaborations. These social platforms will facilitate
and capture the coordinating conversations and key information resources that form the dialogue around proposal development for collaborative efforts.

**Postscript:** Core values in our institution include the pursuit of fundamental research as well as targeted research, team science approaches, and clinical/translational, health policy, health systems, and patient safety and quality of care research. These are critical to our research mission and are also essential for our educational and patient care missions. The Subcommittee recognizes the opportunities and also the challenges facing UCSF in the decades ahead, but we believe that strategic, deliberate, disciplined, and innovative approaches to faculty success, space planning, and financial sustainability, as recommended herein, will enable accomplishment of our long-term goals.

**TABLE 1- Current and Projected Research Space and PI growth through 2030:**

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<th>FY 2011</th>
<th>FY 2021(^4)</th>
<th>FY 2030(^4)</th>
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<tr>
<td><strong>Total Research Space in ASF(^{1,2})</strong></td>
<td>1,836,100</td>
<td>1,836,100</td>
<td>2,306,500</td>
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<td><strong>Net New Research Space</strong></td>
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<tr>
<td><strong>Number of PIs</strong></td>
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<td>2,357</td>
<td>2,944</td>
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<tr>
<td><strong>Net New PI from 2011</strong></td>
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<td>187</td>
<td>774</td>
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**Notes:**

1. Total Research Space includes approximately an additional 3% factor to account for research support functions and 10% factor for LARC and Animal Care.
2. Enabling Technology Centers currently occupy 4% of total research space. That is anticipated and recommended to increase to 10% over the LRDP timeframe and is included in total Research Space.
3. Assumes the modest research growth will be accommodated in existing underutilized vacant space research space through 2021. Under the ongoing Biomedical Computational Science initiative, 20 additional faculty could be recruited over the next 15 years that is not included in the 2021 PI projections. However, it is assumed that they could be accommodated in existing underutilized space in QB3 or Genentech Hall.
4. A 2.5% growth factor is assumed from 2022-2030.