UNLV

Top Tier Research, Scholarship and Creative Activities

2015 – 2016 Updates

SUMMARY

Infrastructure 2-1: Research Infrastructure Master Plan

(**Stan Smith**, David Frommer, Jennifer McCarthy, Deans, Academic Health Center Rep, Ernesto Abel-Santos, Liam Frink)

- Reviewed University Leadership Council (2010) report on managing space utilization (Fall '15) and developed summary (s**ee Part A**).
- Benchmarked Top Tier peer institutions for total research expenditures and research space (Fall '15) (s**ee Part B**).
- Benchmarked peer institutions for new construction and renovation costs for research space additions (s**ee Part B**).
- Obtained from our current F&A proposal UNLV research space committed to organized research (**see Part B**).
- Wrote a White Paper that synthesized this information and projects next steps (Fall '15) (**see Part C**).
- Met as a sub-committee (Winter '16) to overview the White Paper and benchmark data.
- The idea of a research and undergraduate science lab building has also been proposed based on student fees and F&A. This would be debt financed (see attached) and possibly supplemented with donor contributions.

UNLV

TOP TIER RSC WORKING GROUP REPORT

Submitted By:

Stan Smith	Research Office
Name	Department

Research Infrastructure Master Plan	2-1
Name/Topic of Working Group	Goal #

Working Group Members:

Stan Smith	Research Office
Name	Department
David Frommer	Planning & Construction
Name	Department
Carl Reiber	Provost Office
Name	Department
Jennifer McCarthy	Provost Office (space planning)
Name	Department
Ernesto Abel-Santos	Chemistry (Fac Senate rep.)
Name	Department
Liam Frink	Research Office (undergrad research)
Name	Department
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Name	Department

2015-2016 Accomplishments:

-- Reviewed University Leadership Council (2010) report on managing space utilization (Fall '15).
-- Benchmarked Top Tier peer institutions for total research expenditures and research space (Fall '15).
-- Benchmarked peer institutions for new construction and renovation costs for research space additions
-- Obtained from our current F&A proposal UNLV research space committed to organized research.
-- Wrote a White Paper that synthesized this information and projects next steps (Fall '15).
-- Met as a sub-committee (Winter '16) to overview the White Paper and benchmark data.

Recommendations:

-- Continue an inventory of current research space and identify occupancy, activities conducted, and productivity metrics for those spaces.
-- Begin work on a Research Space Use Policy.
-- Begin work on creating a Space Renovation Plan.
-- Begin work on a plan for potential new research-intensive building needs to meet Top Tier goals.

2016-2017 Goals (Where possible, specify who should be responsible for these next year):

-- Finish inventory of current space and productivity metrics (spring-summer '16; Smith).
-- Research Space Use Policy (Fall '16; sub-committee).
-- Master planning for new buildings and renovation (ongoing).

Notes, Comments, & Feedback:

Part A

University Leadership Council (2010) Maximizing Space Utilization: *Measuring, Allocating, and Incentivizing Efficient Use of Facilities.* Washington, DC.

The Space Utilization Imperative:

- More institutions are recognizing low space utilization to be a meaningful impediment to growth. Historically, it was easier for the university to erect new buildings than to convince deans and faculty to cede underutilized research space.
- Higher education's "build to grow" habit is increasingly unaffordable in the current economic climate.
- At current productivity rates, research universities need $1 million in extra lab space to accommodate a $1 million increase in expenditures, with this number potentially higher in less research-intensive (< $100 million) institutions.
- Few universities currently base space assignments on research funding productivity data.
- Full deployment of utilization best practices allows the institution to accommodate 30% more activity (broadly defined) without additional space.

Four mutually reinforcing factors that perpetuate space underutilization:

- Lack of actionable utilization data.
- An "illiquid" marketplace – space is trapped in unproductive purposes, as deans, faculty and centers hoard facilities since there are no incentives to share space or give up space that is not being productively used.
- No official space standards, so allocation decisions are based on subjective criteria.
- Deans or departments rarely have sufficient financial resources to reconfigure space.

Five disciplines required to improve utilization:

- Consistent definitions of types of space and reliable data on how space is used.
- Declare explicit campus-wide standards for space allocation and exceptions management.
- Create rewards and penalties for improving utilization and surrendering unneeded space.
- Central administration must play a "market-making" role, specifically financial support for reallocation and reconfiguration of space.
- Embrace a "collaborative space" architectural philosophy.

Managing the cultural shift needed to improve space utilization:

- Researchers will potentially trade less space for better space.
- Researchers will share space with assurances that they can get more space when needed.
- Facilities staff must adopt a more proactive, consultative role, not just impose standards.
- Space utilization is a promising area to pilot data-driven resource allocation practices.

Part B

Peer Analysis of Research Expenditures and Space for 2011 NSF data, with datapoints representing UNLV as a percent of peer institutions (data for specific disciplines are space)

University	Total Expenditures	Total Space	Biology	Computer + Engineering	Math + Phys. Sci.	Health	Psychology + Social Sciences
Arizona State	11%	23%	16%	16%	33%	46%	25%
Colorado	10%	20%	17%	22%	16%	64%	17%
Houston	35%	27%	45%	18%	22%	27%	43%
Central Florida	36%	78%	35%	59%	212%	NA	120%
Oregon	38%	55%	31%	300%	48%	100%	27%
New Mexico State	28%	43%	71%	39%	53%	900%	257%
UNR	44%	23%	31%	40%	23%	12%	33%
San Diego State	37%	61%	42%	346%	108%	25%	23%

University	Allocation Model	Benchmark (Research Expenditures))
UC San Francisco	900-1200 asf per PI (600-800 for dry lab)	$120 ICR/asf + 8 qualitative criteria
	700-900 for other faculty (550-650 for dry lab)	
Johns Hopkins		$400 total expenditures/asf
Northwestern		$600/asf wet, $1000/asf dry
Temple	1000-1200 asf per PI	$110 ICR/asf; $350-400K total directs
Arizona		$325/asf
Washington		$270/asf
Harvard		$175 ICR/asf
Chicago		$300 mtdc/asf (dry labs should be higher)
Utah	600 asf per PI	$350/asf
Washington, St. Louis	150-350 asf 'per FTE'	$225-350/asf "rent"
Cincinnati	120 asf per FTE	
Minnesota	220 asf per researcher	
Oklahoma	300 asf per FTE	
Southern Illinois	550 asf per PI	225 added asf per $25K expenditures
Texas Health Sci San Antonio	300 asf per $40K (wet) or $100K (dry)	$250/asf
Texas Tech	500 asf for PI + 100 asf per additional FTE	
Toronto	484 asf for PI + 242 asf per additional FTE	
Indiana Cancer Ctr	direct costs generated/$500	$250K for a 500 sq ft lab
UC Davis		$250/asf

Organized Research Analysis at UNLV		
Academic Unit	**OR (% NASF)**	**OR ($/NASF)**
Transportation Research Cent	64%	$404
Allied Health Sciences	43%	$151
Environ & Occup Health	48%	$113
Geoscience	49%	$82
Psychology	21%	$73
Physics & Astronomy	45%	$68
Civil & Envir Engineering	49%	$67
Mechanical Engineering	63%	$66
Elec & Comp Engineering	35%	$65
Chemistry	49%	$52
Life Sciences	38%	$40

Part C

Top Tier: Research, Scholarship and Creative Activities (RSC)

Subcommittee 2-1: Research Infrastructure Master Plan

Overall Objective:

It is recognized that quality research space is necessary to recruit, retain, and develop UNLV's faculty, staff and students to their fullest potential. It is also recognized that inefficient use of research space limits our ability to effectively invest financial resources toward a productive research program. Therefore, the University must be able to strategically assign, or re-assign, research space (both quantity and quality) based upon current usage, greatest need, productivity metrics, and strategic priorities, and must also design plans that allow our financial resources to go as far as possible in creating quality research space. Therefore, an objective of our overall Top Tier Plan is to create a Research Infrastructure Master Plan that will guide strategic research space planning into the future.

Guiding Principles for a Research Infrastructure Plan:

- Research space belongs to the institution.
- Research space assignments are not permanent. Space is assigned to activities and not individuals.
- Research space allocations should be based on existing facilities, where possible, to ensure that current facilities are fully utilized before pursuing major construction or renovation projects.
- Productivity measures for dedicated research space may vary; financial measures should only be part of the overall assessment of research space assignment. Financial measures should be either total research expenditures ($/asf) or indirect costs generated ($/asf). Other important productivity measures should include (1) quality and impact of the research being conducted, (2) alignment of the research activity with strategic priorities, and (3) number of students participating in the research.

Background and Current/Future Needs:

- A campus goal of research expenditures increasing to $150 million in concert with almost 200 new research-intensive faculty hires will require new dedicated research space, renovation of lower quality space to meet the needs of modern research labs, and increasing efficiency of current research space use.
- Given that our research labs are currently occupied, the accommodation of new research-intensive faculty hires will almost certainly have to be met with a new building (or multiple buildings) with strong research-lab-emphasis floor plans.
- However, current funding levels indicate that our existing research spaces are not being utilized to their maximum efficiency. This requires that an internal prioritization process is needed to locate our most productive researchers in our highest quality lab spaces while also ensuring that all faculty have access to research space that can adequately support their research programs.
- The acquisition and renovation of research space (e.g., the EPA buildings on campus) is also an important avenue through which we can increase our research space portfolio. The quality and quantity of this space will need to be balanced from a planning perspective with current space on campus as well as new capital projects, with re-allocation a priority over expensive renovation of low-quality space.
- Therefore, a Research Infrastructure Master Plan is needed to factor in and balance the above needs with current and future space opportunities.

Key Components of a Research Infrastructure Master Plan:

1. Inventory current research space and identify occupancy, activities conducted, and productivity metrics for those spaces.
2. Create a Research Space Use Policy that defines how our varying research spaces should be utilized.
3. Create a Space Renovation Plan that identifies and prioritizes opportunities to increase our research portfolio through renovation of existing or newly acquired space.
4. Create a plan that identifies our long-term needs for new research facilities (buildings) to meet Top Tier growth scenarios.

Current Research Space:

- Most of the current lab spaces on campus are in discipline-specific buildings, either of colleges (e.g., Engineering, Health Sciences) or departments (e.g., Chemistry, Physics).
- UNLV has two interdisciplinary research buildings that are dedicated almost entirely to research, one that is new and of high quality (SEB) and one that is older and of moderate quality (HRC).
- There are three primary models of current research occupancy: (1) faculty with their own research lab; (2) research-dedicated labs with multiple occupants in an open floor plan; and (3) dual-use labs that serve both research and formal instruction. There is no space policy on campus that designates labs into one of the three above categories, although individual buildings/departments tend to adopt one of them and manage their space accordingly. The SEB and HRC have a mixture of (1) and (2), with (2) most prevalent. Most of the departments within the College of Sciences adopt model (1), while many college-based buildings adopt model (3).

Information Needs:

- For an effective Master Plan to be developed, we need a database that identifies current occupancy in our research labs and the productivity of those occupants, and the total range of functions (research, training, formal instruction) that occur in each space.
- Productivity of research labs will be assessed by obtaining data on research expenditures, scholarship (publications, citations, etc.), mentoring/training of students (both graduate and undergraduate) and post-docs, and economic/community outreach activities (e.g., patents, commercialization, clinics, community service activities).
- Productivity of Core Facilities, defined as recharge centers with specialized equipment or services that are utilized by multiple researchers, will be assessed based on number of users, revenues, number of different academic units served, and other criteria indicative of successful core facilities at Tier 1 research universities.
- Lab occupants and expenditures data will be obtained from ARCHIBUS; publications, mentoring and other data from individual annual reports or Digital Measures; and citation data will be obtained from Google Scholar or similar search engine.

Potential Lab Designations in Master Plan:

- Top-Tier Labs will be research-dedicated spaces in the SEB and extensively-renovated labs in other buildings (e.g., HRC) where the occupants would generate $300/asf or more in research expenditures per year and have robust scholarship and mentoring activity.
- Mid-Tier Labs would be in other (non-SEB) buildings where a target of $150/asf or more per year would be a goal but research expenditures would be balanced by scholarship and mentoring activity.
- Lower-Tier Labs would be lab spaces that may not have sophisticated research infrastructure but would provide dedicated research space for unfunded faculty in a multi-occupant format.

- Superimposed on this hierarchy, and helping us more accurately define spaces, would be lab configurations and services. Specifically: Dry Labs, primarily consisting of linear benches or cubicle/pod configurations where computational or field-based projects are performed; Wet Labs, primarily consisting of linear benches, sinks, hoods, standard gases, and single-pass air; Wet Labs Plus, wet labs with specialty overhead infrastructure, process water and specialty gases, flexible electric, exhaust, pathways, and/or laser curtains; and High Bay Labs, which have high ceilings for engineering or science projects with potentially sophisticated mechanical infrastructure attached to the ceiling or walls and/or with reinforced floors. The operational costs of operating these types of labs will figure into the designation of a tier structure as outlined above.

Broad Principles of a Top Tier Master Plan:

- The assessment of research expenditures and scholarly productivity will be over a multi-year period (to be determined) so that lab occupants that may be between grants and are actively seeking research funding are not re-assigned to lower-tier research space. However, lab occupants that do not meet the productivity criteria of a given lab tier level will be requested to vacate and occupy less costly space in favor of more productive researchers (or new hires).
- As UNLV transitions to a more interdisciplinary research portfolio, the current model of strict allocation of research space to each academic unit will need to evolve. While Deans will be tasked with managing the research spaces occupied by their faculty, a campus space-use policy will be needed that (1) encourages interdisciplinary use of research labs where appropriate, and (2) optimizes the most productive use of all research space on campus, in our interdisciplinary research buildings but also in our academic unit-based buildings. The full research space portfolio will be managed by the Provost and Deans in collaboration with the Vice President for Research in order to reach maximum productivity of our finite research space.