THE UNIVERSITY OF NEW MEXICO
OFFICE OF THE VICE PRESIDENT FOR RESEARCH

RESEARCH STRATEGIC PLAN FINAL WORKING GROUP REPORT ON **RESEARCH INFRASTRUCTURE**

February 15, 2017

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Goals

The general goal of this working group is to assess the research infrastructure on UNM Main Campus, and to make recommendations on the basis of that assessment. Research infrastructure comprises facilities, service centers, major equipment, instruments, technologies, and administrative support units that provide or enhance research capability or capacity. Our assessment had four specific goals:

- Identify strengths or components that are important and high quality.
- Identify weaknesses or components that need to be remedied.
- Compare with peers to identify infrastructure ideas that UNM can borrow.
- Identify opportunities for strategic improvements that would enhance research capacity and impact.

Methods

The working group used two methods of obtaining data in order to assess research infrastructure and formulate recommendations:

Method 1. The primary method was a survey of the Main Campus faculty. The goal of the survey was to capture the perceptions of principal investigators regarding the research infrastructure that supports their work.

Method 2. The secondary method was a set of interviews with individuals responsible for overseeing key components of research infrastructure.

Findings

Survey Results

The survey of faculty was conducted between November 13, 2016 and December 2, 2016. The survey was implemented in the Opinio system and was distributed by direct email to approximately 2100 faculty members. It was targeted at a subset of those faculty members who are based on Main Campus and consider themselves to be research-active. The full text of the survey is provided in Appendix 2. A preamble to the survey explained its purpose to potential respondents. The survey itself consisted of 100 questions: five questions about the respondent's affiliation, rank, and research profile, 80 questions about specific components of UNM's Main Campus research infrastructure, one question about space (quantity, repair, appropriateness), one question about reliance on infrastructure at other institutions, three questions about interactions with the Health Sciences Center (these will be reported on separately by the Health Sciences Center Working Group), five questions about human capital (these will be reported on separately by the Human Capital Working Group), four text-answer questions about general infrastructure issues (strengths, weaknesses, opportunities, and an open-ended question), and a final question soliciting volunteers for potential follow-up surveys or interviews. Most of the component-specific questions only appeared in a respondent's survey if they selected that component from a list to indicate that they interacted with that particular component; as a result, the surveys were of manageable length.

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Some faculty members reported technical problems accessing the survey through the Opinio system, including a repeated problem in which faculty members would log in and, rather than a blank survey, they would find a survey that had already been filled out by a colleague. Despite these problems, the survey received 273 responses. Summary results for each survey question are presented in Appendix 3. Raw data are available upon request from the Office of the Vice President for Research.
Respondents were comprised primarily of tenure-track faculty members (~76%) who were almost equally divided among Assistant Professor (n=71), Associate Professor (n=60), and Full Professor levels (n=65). 30 chairs and directors responded (~11% of respondents). The remainder of respondents were (in descending order of frequency): Research Faculty (including Research Professors and Post-doctoral Fellows), Lecturers, and Emeritus Professors. Ninety-eight percent of respondents were from Main Campus, while the remaining 2% were from branch campuses.
About 2/3 of respondents indicated that their research was supported by federal funding. Respondents selected an average of 1.8 options each on the funding sources question. After federal funding, the most commonly reported answers were internal UNM funding (33%), foundation funding (23%), unfunded research (22%), state funding (14%), other sources (9%), private funding (7%), community funding (5%), and corporate funding (4%).

Respondents generally considered themselves to be active researchers. Fifty-three percent described themselves as "very active," and 88% described themselves as either "very active" or "active" in research.

Respondents reported 1.26 affiliations each, on average. Approximately 100 distinct affiliations were represented (see Appendix). The most common affiliations were Department of Biology (26), Department of Psychology (18), Department of Physics and Astronomy (13), Anderson School of Management (9), Department of Earth & Planetary Sciences (9), Chemistry & Chemical Biology (8), Computer Science (8), and Electrical and Computer Engineering (8). The next most common 36 affiliations garnered between three and seven respondents each.

Quantitative Survey Results: Faculty perceptions of specific components of infrastructure

The survey asked faculty to select from a list of components to indicate components of UNM's research infrastructure with which they interact. The list was developed by working-group members who attempted to strike a balance between having a list that was reasonably comprehensive and having one that was not too long so as to become unwieldy. The list included various administrative units, centers, and facilities that are important to research at UNM. Once respondents indicated that they interact with certain components, they were then asked to rate those components on a Likert-type scale from one–five (one being the worst and five being the best) with respect to quality, importance, and comparison to analogous components at peer institutions. In Table 1, we summarize the average numerical scores for each component for each of those three rating categories. We also report the number of respondents that reported interacting with each component.

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Component name	Responses	Importance	Quality	Peers
Office of Sponsored Projects (OSP)	148	4.1	2.8	2.5
Information Technology (IT)	132	4.1	2.5	2.4
Contract and Grant Accounting (CGA)	119	4.1	3.1	2.8
Human Resources (HR)	108	3.8	3	2.9
Library Collections: Books, journals & databases at Main Campus libraries	104	4.7	4.2	3.6
Library Research Support: Reference & research data management services at Main Campus libraries	93	4.4	4.2	3.9
Purchasing Department (PUR)	71	3.9	2.8	2.7
UNM Foundation (UNMF)	70	3.4	2.8	2.5
University Communication and Marketing (UCAM)	57	3.4	3.2	2.9
Facilities: Planning, design, construction & maintenance (PDC & PPD)	52	3.9	3.2	3
Safety and Risk Services (SRS)	52	3.6	2.5	2.6
Library Instruction: Research, information literacy, & data management classes & training sessions at Main Campus libraries	48	4.3	4.4	4.1
Library Spaces: Spaces and furnishings in support of student and faculty research at Main Campus libraries	48	4.2	4	3.6
STC.UNM (formerly Science and Technology Corporation @ UNM)	47	3.6	3.6	3.7
Library Technology: Includes computers, software and other technologies in support of student and faculty research at Main Campus libraries	46	4.3	4	3.7
Latin American & Iberian Institute (LAII)	44	4.5	4.3	4.3
Responsible Conduct of Research Training Program (RCR)	37	3.8	3.8	3.6
RWJF Center for Health Policy (RWJF)	32	3.8	3.6	4
Center for Southwest Research and Special Collections (CSWR)	28	4.5	4.6	4.5
UNM Press	24	4.2	4.1	3.7
Institute for Social Research (ISR)	19	4.2	4	3.9
Center for Regional Studies (CRS)	19	4.2	4.3	4.4
Health, Exercise & Sports Sciences Dept. Johnson Center Facilities (HESS)	14	4.3	4	2.8
Office of Government and Community Relations (OGCR)	10	3.4	3.6	3.4

Table 1: Faculty perceptions of quality, importance, and peer-comparison (quality relative to analogous components at peer institutions) for specific components of UNM's Main Campus research infrastructure that are core university services or that serve multiple colleges but are not directly under the control of the OVPR. Mean values of scores (one–five, five being the best) are reported for importance, quality, and peer-comparison, respectively. Components are sorted in descending order of the number of respondents. Components that received fewer than seven responses are not included.

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Component name	Responses	Importance	Quality	Peers
Office of the Vice President for Research (OVPR)	174	3.9	3.3	2.9
Office of Institutional Review Board (OIRB)	102	4.4	3.9	3.6
Conflict of Interest (COI)	78	3.4	3.1	3.1
Faculty Research Support and Development Office (FRDO)	55	4.2	4	3.7
Center for Advanced Research Computing (CARC)	54	4.1	4	3.8
Office of Research Compliance (COMP)	44	3.7	3.2	3.4
NM EPSCoR	35	3.5	3.6	3.4
Center for High Technology Materials (CHTM)	33	4.3	4.2	4.4
Export Control & Industrial Security (ECISD)	29	3.6	3.6	3.5
Bureau of Business & Economic Research (BBER)	22	4.1	4.1	4
Office of Institutional Animal Care and Use Committee (IACUC)	22	4.2	3.6	3.6
Center on Alcoholism, Substance Abuse, and Addictions (CASAA)	20	4.7	4.6	4.6
Center for MicroEngineered Materials (CMEM)	18	3.9	4.2	3.7
Southwest Hispanic Research Institute (SHRI)	16	4.4	4.1	4.3
Center for Policy Evaluation and Research (CEPR)	14	3.3	3.6	3.7
Data Observation Network for Earth (DataONE)	9	3.1	2.9	2.8
Geospatial & Population Studies (GPS)	7	3.8	4	4

Table 2: Faculty perceptions of quality, importance, and peer-comparison (quality relative to analogous components at peer institutions) for specific components of UNM's Main Campus research infrastructure that are overseen by the OVPR. Mean values of scores (one–five, five being the best) are reported for importance, quality, and peer-comparison, respectively. Components are sorted in descending order of the number of respondents. Components that received fewer than seven responses are not included.

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Component name	Responses	Importance	Quality	Peers
Sevilleta Field Station (SFS)	36	4.0	4.3	4.1
Museum of Southwestern Biology (MSB)	33	4.7	4.6	4.6
Feminist Research Institute (FRI)	31	4.3	4.1	3.9
Maxwell Museum Collection (MMC)	26	4.3	4.3	4.2
Statistics Consulting Clinic (Stats)	24	4.0	3.8	3.5
Center for Evolutionary and Theoretical Immunology (CETI)	21	4.4	4.6	4.5
Center for Stable Isotopes (CSI)	21	4.4	4.4	4.5
Earth Data Analysis Center (EDAC)	18	3.5	4.1	3.5
Center for Biomedical Engineering (CBME)	15	4.3	4.3	4.1
Molecular Biology Facility of the Biology Department (MBF)	15	4.8	4.4	4.1
Building Plans for Physics, Astronomy, & Interdisciplinary Science Bldg. (PAIS)	15	4.6	4.0	4.1
Center for Water and the Environment (CWE)	12	4.5	4.6	5.0
Institute for Meteoritics (IOM)	12	4.3	4.6	4.6
Castetter Animal Research Facility (CARF: Biology Dept)	11	4.6	4.1	3.1
Institute of Medieval Studies (Medieval)	11	4.8	4.7	4.0
PIVOT research funding system	11	3.2	3.4	4.7
Department of Chemistry analytical facilities (Chem.)	10	4.4	3.8	3.0
Cell Biology Facility of the Biology Facility (CBF)	9	4.3	4.1	4.0
Castetter Hall Greenhouses (Biology Dept)	9	4.5	4.1	3.6
Center for Emerging Energy Technologies (CEET)	8	3.9	3.9	3.7
Logan Hall Animal Research Facility (LARF)	7	5.0	3.8	4.0

Table 3: Faculty perceptions of quality, importance, and peer-comparison for specific components of UNM's Main Campus research infrastructure that are located within colleges or departments. Mean values of scores (one–five, five being the best) are reported for importance, quality, and peer-comparison, respectively. Components are sorted in descending order of the number of respondents. Components that received fewer than seven responses are not included.

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We used the four data columns in Tables 1-3 to identify infrastructure components that stood out in terms of faculty perceptions of their quality or importance. In order to do this, we used a principal components analysis (PCA), a method that provides a way of visualizing variation in the data by consolidating response variables (in this case, the four variables are consolidated into two)[1]. When the PCA was used on all 62 components that were rated by at least seven respondents, it revealed that administrative and compliance units are generally perceived as having lower quality than research centers and facilities. That result likely reflects a tendency for researchers to have positive views of places where they generate data, and relatively negative views of units that they associate with rules and forms, and that might contribute only indirectly to their research productivity. Because of this dichotomy, PCA was conducted separately for three categories of research infrastructure components: Core university infrastructure units (Fig. 1), units overseen by the OVPR (Fig. 2), and College- or department-specific units (Fig. 3). Some units were included in multiple categories for the sake of comparison with analogous units. PCA's for each of these three subsets revealed some clear strengths and weaknesses in the eyes of the faculty.

Among core university units, high perceived importance and quality characterized all the key functions of UNM Libraries, as well as the Center for Advanced Research Computing (CARC), the Office of the Institutional Review Board (OIRB), the Institutional Animal Care and Use Committee (IACUC), the Statistics Clinic, and the Responsible Conduct of Research training program (RCR) (Fig. 1). These results were generally consistent with the qualitative comments, except for OIRB, which received notably mixed reviews in comments, likely due to its recent reorganization. The reorganization of OIRB included a change of leadership that was viewed by many human-subjects researchers as a substantial improvement. The PIVOT research funding database, although apparently well-regarded, received a low response rate (11 responses), perhaps because it is a relatively new system. On the low end with respect to quality and comparison to peer institutions (right side of Fig. 1), ten units stood out: OVPR, OSP, IT, HR, CGA, UCAM, Purchasing, SRS, UNMF, and COI. There was ample support in the qualitative section of the survey to confirm that these units are considered by faculty researchers to be weaknesses in the UNM research infrastructure.

Among units overseen directly by the OVPR, CASAA was an outlier with respect to its high perceived quality and favorable comparison to peer institutions (Fig. 2). Other highly rated units included CBME, SHRI, and CHTM. On the low end of the perceived quality spectrum were DataONE, COI, CEPR, NM EPSCoR, Export Control, and the Compliance Office. DataONE was subject to a low response rate (7 responses), but comments suggest that its highly funded operation is out of touch with UNM researchers. The Compliance Office oversees both COI and Export Control, so these units can be considered together. The low perceived quality of these units likely reflects

[1] The resulting charts represent less than 100% of the variance, but this was deemed adequate for our purposes of presenting an initial visualization of the data that could guide development of recommendations based on faculty perceptions of quality and importance of rated units.

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the fact that the rules that are tracked and enforced by these units are viewed as tedious barriers to productivity by researchers who are forced to comply. These offices have undergone substantial reorganization in recent years, making ratings potentially misleading; however, evidence uncovered during our interviews (see appendices) suggests that recent changes to the COI process have made it as researcher-friendly and efficient as it could possibly be. NM EPSCoR received modest ratings on 35 responses. CEPR received modest ratings on 14 responses, with comments indicating that this unit was subject to a recent physical dispersal of its researchers to different physical locations on campus, detracting from its effectiveness.

Among centers, institutes, and college- and department-specific components of UNM's research infrastructure, most were perceived as being relatively high in importance and quality. Among the weaker rated units, RWJF stood out by having a very high number of responses (32 total). The survey results provided evidence that certain infrastructure components are strengths in the view of the faculty. The highest rated units included MSB, CSWR, CWE, LAII, CETI, CASAA, CSI, IOM, MBF, and IMS. Additionally, LAII, Sevilleta, and CHTM stood out by having high quality ratings and very high response rates.

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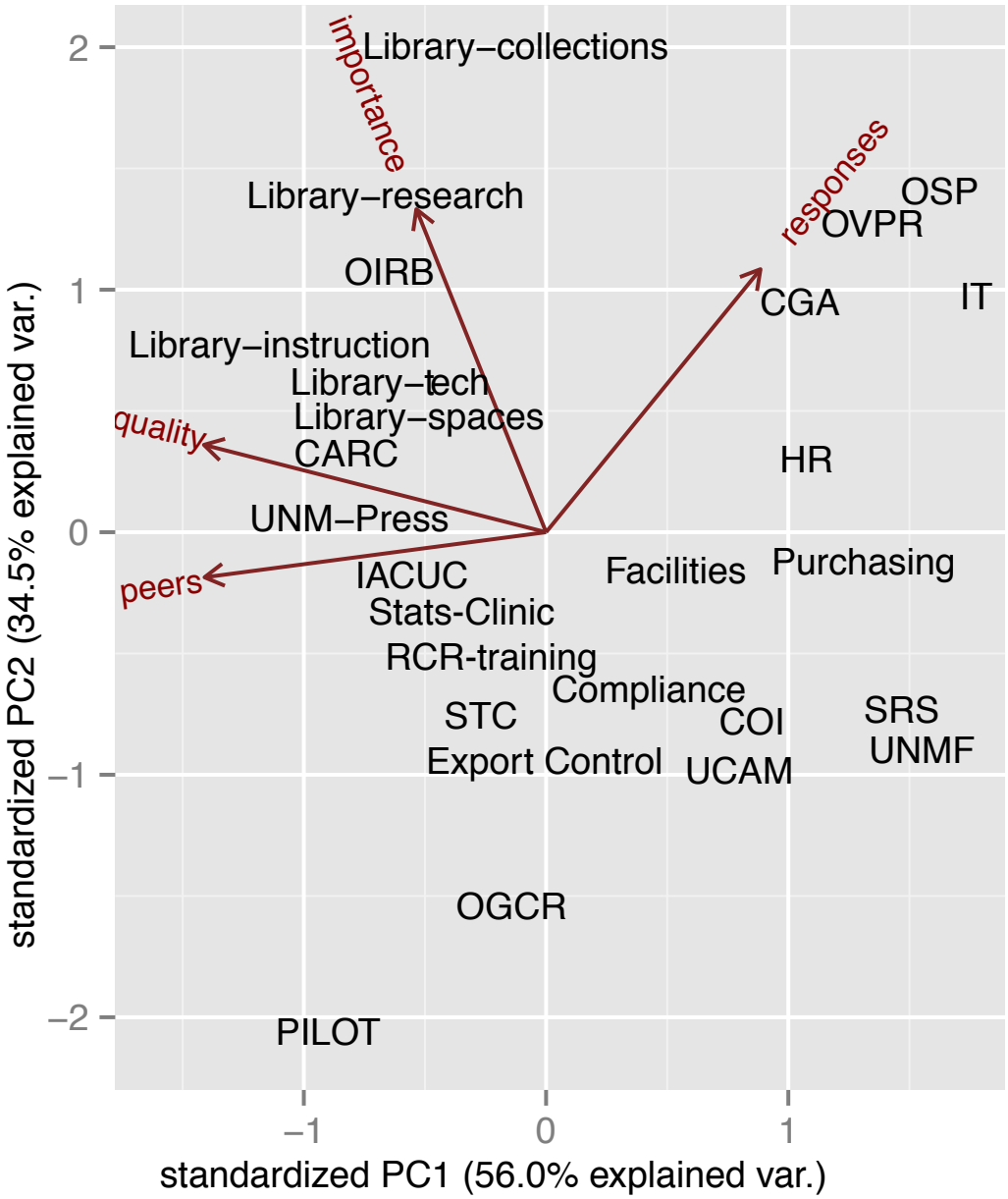

Figure 1: Distribution of core university infrastructure components with respect to the number of responses and mean scores for perceived levels of importance, quality, and comparison to peer institutions (based on principle components analysis of scaled and centered variables, with oblique rotation). For abbreviations, see Appendix 1.

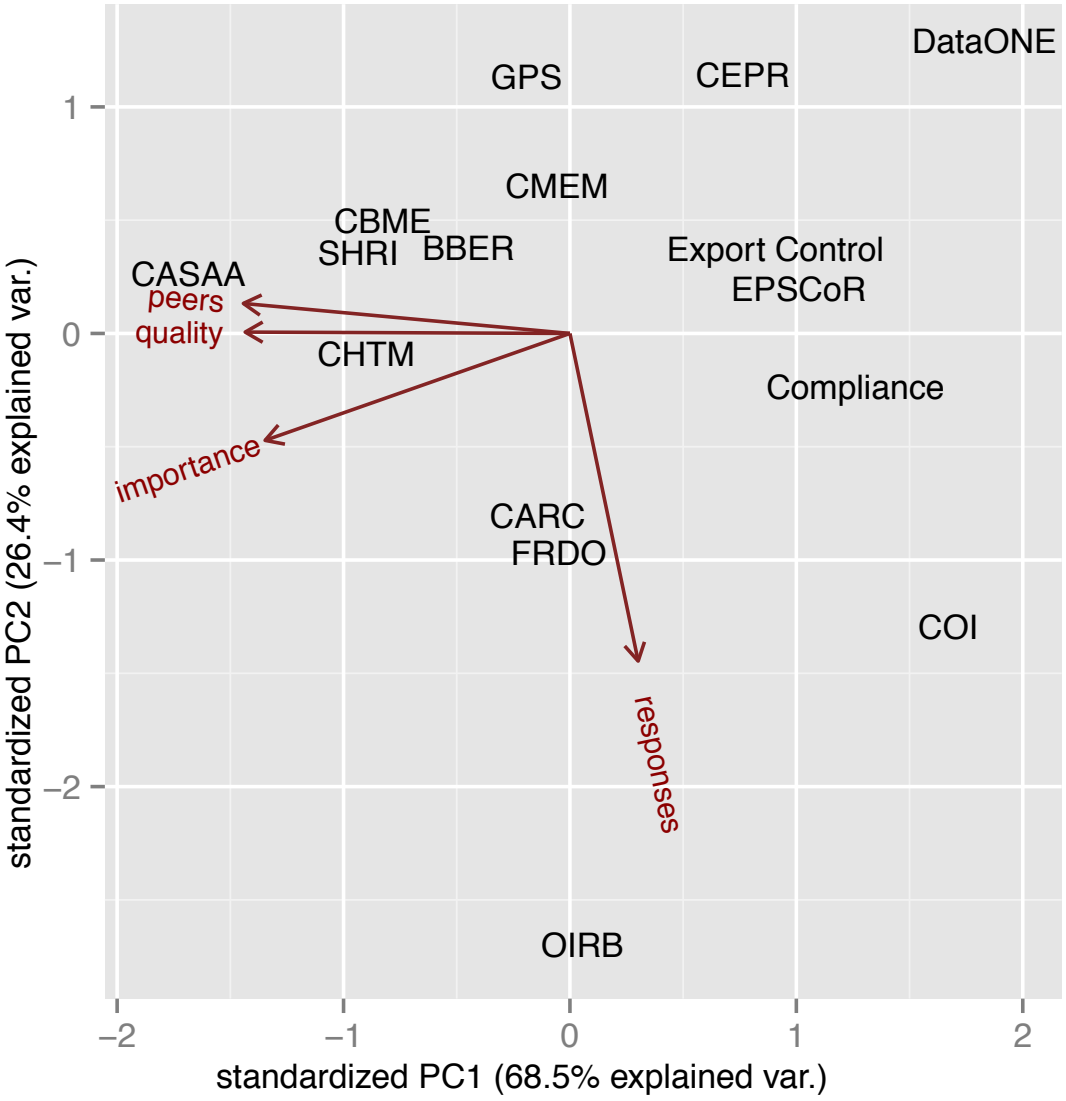

Figure 2: Distribution of OVPR-associated infrastructure components with respect to the number of responses and mean scores for perceived levels of importance, quality, and comparison to peer institutions (based on principle components analysis of scaled and centered variables, with oblique rotation). For abbreviations, see Appendix 1.

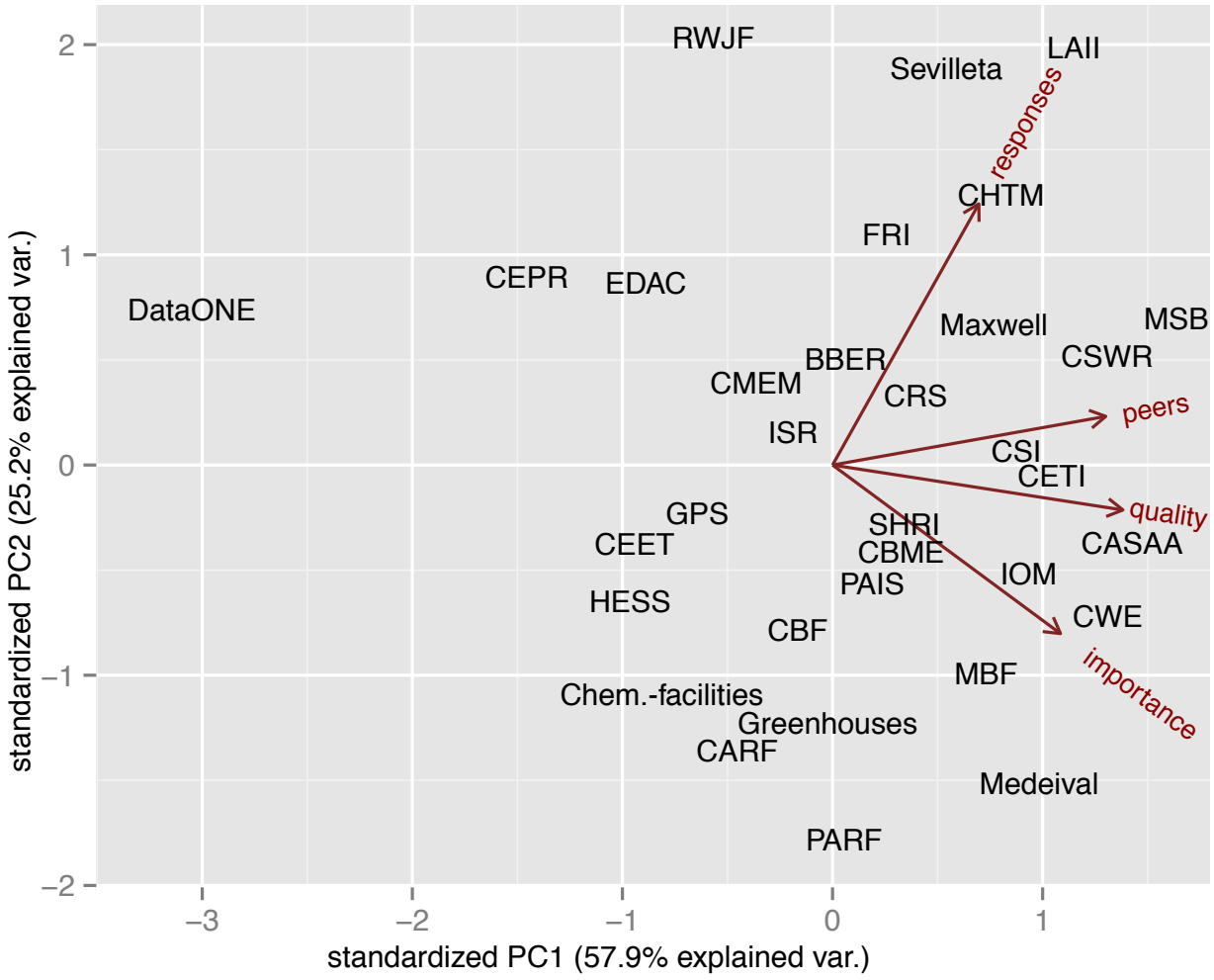

Figure 3: Distribution of selected centers, institutes, and college- and department-specific infrastructure components with respect to the number of responses and mean scores for perceived levels of importance, quality, and comparison to peer institutions (based on principle components analysis of scaled and centered variables, with oblique rotation). For abbreviations, see Appendix 1.

Qualitative survey results: Faculty perceptions of strengths, weaknesses, & opportunities

Strengths

Question 91 of the survey asked faculty researchers to list what they considered to be the strengths of UNM's research infrastructure. This question received 2,909 words of response from 119 respondents. The responses were analyzed to extract specific phrases or references to entities that were perceived to represent strengths of infrastructure, and the number of mentions of each were quantified (Fig. 4).

Figure 4: Strengths of UNM's research infrastructure as identified by faculty survey respondents. Phrases were extracted from raw answers and consolidated around common ideas.

In a result that might be considered unsurprising, the strength most frequently mentioned by the faculty was the faculty. Although this sounds at first to be a self-serving selection, detailed examination of the commentary reveals that faculty researchers have deep respect for their colleagues, and an intimate understanding of the challenges that they overcome on a routine basis to achieve success and recognition in their disciplines. Comments indicated faculty perceive the road to research success at UNM requires navigating institutional barriers to productivity, at least some of which are unnecessary.

A clear category of strength recognized in different ways by many survey respondents was comprised of the several research centers and institutes that provide high quality infrastructure for research. The support provided by UNM for proposal development, most notably the Faculty Research Support Officers (FRSO's) were frequently mentioned. CARC was cited as a strength by many faculty. Museum collections were frequently cited as strengths, including those of the Museum of Southwestern Biology and Maxwell Museum of Anthropology. Other strengths that were frequently mentioned include the staff for many support units including the libraries, various analytical core facilities, IT, OSP, and OVPR.

Some units were cited as strengths, but also as weaknesses in the following question. The Office of the Institutional Review Board and the Office of the Vice President for Research were each cited as strengths by several faculty who pointed to recent improvements in the administrative structure, transparency, and efficient performance of those units. Furthermore, several faculty respondents pointed to internal research funding as being an essential strength, despite that the plurality of opinion seems to be that there is not nearly enough internal research funding available (see Weaknesses, below). The same could be said of interdisciplinary collaborative opportunities –existing ones are highly valued, but many faculty reported that expansion of such opportunities is urgently needed.

Weaknesses

Question 92 of the survey asked faculty researchers to list what they considered to be the weaknesses of UNM's research infrastructure that were in need of remedy. This

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question received 5,983 words of response from 133 respondents. The responses were analyzed to extract specific phrases or references to entities that were perceived to represent weaknesses of infrastructure, and the number of mentions of each were quantified (Fig. 5).

The prominent weakness that was recognized by many faculty was insufficient funding support. Faculty cited insufficient funding for many functions that they consider to be core university obligations as well as those that they consider to be efficient investments in research productivity. The degree of state investment in the research mission of UNM is widely viewed as inadequate and insufficient to compete with peer institutions in other states. Weak state funding is exacerbated by poor performance of the UNM Foundation in terms of supporting the research mission.

This weakness in funding is felt strongly in faculty salaries that are lagging behind peer institutions to the extent that even high-performing researchers at UNM are trailing national averages for their title and discipline. The salary problem may be even worse for critical research support staff, for many of whom take-home pay is substantially lower than it was a decade ago because of rising benefit costs and scarce raises. Additional weaknesses that were frequently cited include IT, OSP, general issues with leadership style and short-term planning, OVPR, insufficient investment in maintenance of buildings and other facilities, and a tendency for support units and departments to operate in isolated spheres, or silos, that fail to communicate with each other.

Regarding the latter weakness, several faculty respondents cited the potential for streamlining the proposal development process by breaking down some of the barriers between these silos that they view as unnecessary boundaries between units. A repeated sentiment in the weaknesses section was that UNM's leadership, whether at the OVPR or elsewhere, had often failed to reward or even acknowledge research success. This feeling of lack of recognition could have real consequences if, for example, it exacerbates tensions between PI's and administration over such issues as flexibility with F&A (overhead) policies and proposal submission deadlines.

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Figure 5: Weaknesses of UNM's research infrastructure as identified by faculty survey respondents. Phrases were extracted from raw answers and consolidated around common ideas.

Opportunities

Question 93 of the survey asked faculty researchers to list what they envisioned as opportunities for strategic improvement of UNM's research infrastructure. This question received 4,075 words of response from 110 respondents. The responses were analyzed to extract specific phrases or references to potential actions that were perceived to represent opportunities for strategic improvement of infrastructure, and the number of mentions of each potential action were quantified (Fig. 6).

The opportunity for infrastructure improvement that was mentioned more than any other involved improved support for PI's at all stages of project development and implementation. Another opportunity that was frequently cited was comprised of various suggestions for improvement of UNM's computational and analytical infrastructure. The latter comments suggested broad recognition by faculty of the emerging importance of 'big data' and computationally intensive analyses for the advancement of their varied disciplines. Further, the faculty recognize that UNM's training programs and computational facilities will both need to improve to meet these emerging opportunities.

Numerous faculty expressed hope that UNM would invest more in facilities upgrades and maintenance, as well as equipment purchases and maintenance to maintain a vibrant research community. Chief among the upcoming investments in facilities is the new building planned for Physics & Astronomy and Interdisciplinary Science (PAIS). Hopes are clearly high for the new building, and respondents from Physics and Astronomy expressed optimism. However, the success of the building may rest on its ability to meet its potential as a hub for interdisciplinary science, and there is substantially more apprehension about that aspect. Clear arguments were made that F&A (overhead) funds are not allocated strategically or fairly among units, a problem that becomes particularly acute when large overhead packages need to be financed for new faculty hires. Several faculty respondents lamented artificial divisions between some departments and support units. A recurring theme was that funds for pilot projects or to support preliminary data gathering toward a large grant were highly valued, but

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less available at UNM than at peer institutions. Faculty respondents argued that such 'seed money' is efficiently spent and such programs should be expanded.

In numerous parts of the survey, respondents expressed frustration over a feeling that communication about research was very poor, and that improvements in communication could be a low-cost way to substantially improve the morale, motivation, and effectiveness of faculty researchers. Communication is often inadequate regarding support systems for research, standard procedures, local examples of success, and the long-term strategies of our administrators.

Other repeated themes in the answers for opportunities included the idea of investing in libraries, rewarding research success, removing barriers to collaboration with HSC investigators, and aggressively pursuing private funds for thing like endowed professorships that pay enormous dividends for the research mission over the long term.

Figure 6: Opportunities for improvement of UNM's research infrastructure as identified by faculty survey respondents. Phrases were extracted from raw answers and consolidated around common ideas.

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Interview findings
Interviews were conducted with key personnel from eleven units. The questions asked in each interview were based on the general questions presented in Appendix 6. Results of the interviews are reported in detail in Appendices 7-17.

Relationship of findings to Environmental Scan
The environmental scan report indicated that there is substantial unpredictability with respect to future opportunities in research funding. This suggests that bottom-up initiatives (those driven by faculty PI's) and recommendations intended to bolster their support systems are ideas that are well suited to the current funding environment.

Relationship of findings to 2007 Research Study Group Report
In 2007, a group of faculty and administrators undertook an effort similar to the current one, but more specifically focused on the proposal development and project administration functions. A survey was issued to faculty investigators to help to understand the strengths and weaknesses of the research project administration process. Interviews were conducted with key personnel. A series of recommendations were issued based on the findings, primarily related to reorganizing the structure of leadership at OVPR, upgrading pre-award and post-award processes, and streamlining compliance. Substantial progress appears to have made over the last nine years since that report, although our survey results reveal that there is work yet to do in these areas.

Strengths
The main strengths are the faculty researchers themselves, as well as the staff research support personnel, particularly at the several highly-active research centers and institutes. Highly regarded units include the FRDO (including the network of individual faculty research support officers, or FRSO's), CARC, OIRB, and the Museum of Southwestern Biology.

Weaknesses
Insufficient funding is perceived as an overarching weakness, but not all weaknesses were attributable to funding shortfalls. Faculty are eager to see a faster pace of improvement in research administration, and better quality support from critical units such as OSP, SRS, and IT. Faculty report siloed support units and departments and ineffective leadership that provides too few incentives for research success.

Opportunities
There is a sense of urgency about emerging opportunities flowing from computational and analytical capabilities, from training to hardware. These could have potential positive impacts on diverse research disciplines at UNM. Barriers can be broken not only for cost efficiency, but to encourage interdisciplinary collaboration and to simplify the research administration process from the PI's perspective. Investments in bottom-up research initiatives are likely to pay off in multitude ways; such investments in PI-driven research could include expanding the FRSO network, upgrading facilities, funding seed grants, funding equipment repair, and similar actions.

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Action Plan

Based on the findings above, we recommend four specific objectives for going forward.

Objective 1: Improve efficiency of research administrative services provided by the Office of Sponsored Projects (OSP) and Contract and Grants Administration (CGA) and improve coordination between OVPR research support (FRDO) and OSP.

Task 1.A: OVPR leadership will provide input into the goals and annual performance review of the OSP Director to ensure a consistent focus on PI/customer service and will meet at least monthly with financial services leadership to review processes.

Metrics: OSP Director achieves or exceeds performance expectations
Timeline: Spring 2017 and ongoing

Task 1.B: The OVPR will engage with the Comptroller to establish a visiting committee to conduct an external evaluation of the processes, procedures, and day-to-day functioning of the OSP by inviting managers from successful Offices of Sponsored Projects at peer institutions. We recommend working with the National Council of University Research Administrators (NCURA) to identify successful leaders of research administration

Metrics: External evaluation completed and report of findings and recommendations submitted
Timeline: End of FY 2018

Task 1.C: The OVPR and OSP will implement and evaluate a pilot project to create full service research support at the college level. Specifically, we propose that one or two CGAs be assigned to work in a college for a six-month trial period with a three-month interim progress report. The CGA would reside in the college office to work collaboratively with the college Associate Dean for Research (ADR), Faculty Research Support Office (FRSO), Fiscal Administrators, and department level grant support personnel to provide inception-to-submission proposal support for PIs and transfer of funded awards to Contract and Grants Accounting. CGAs would still report primarily to the Office of Sponsored Projects with a secondary report to the ADR. Performance goals will be set jointly and performance evaluations will be completed and signed by both the OSP manager and the ADR. Forms will be implemented to gather feedback regarding the pilot program from PIs, departmental grant support staff, the ADRs, and the CGAs. The impact on OSP will also be evaluated. If determined the model has merit, then the pilot period could be extended to be implemented in other colleges and/or extended to include post-award personnel.

Metrics: Evaluation of pilot completed and value of reorganization determined
Timeline: Fall of FY2018

Task 1.D: The OVPR will work with OSP to evaluate and improve (if necessary) the quality of data and data reporting in Cayuse. The OVPR website will link to the new OSP dashboard.

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Metrics: Data in Cayuse is accurate and reliable. Researchers, leadership and administrators can access research award data reports in a timely, efficient manner.
Timeline: New dashboard to be released Spring FY2017. Analysis of data quality to begin early FY2018.

Objective 2: More efficiently manage research equipment and facilities and plan strategically for future needs.

Task 2.A: OVPR will create a standing Large Equipment Advisory Group (LEAG) comprised of representatives of A&S, SOE, Category 3 Centers, and PPG to i) identify significant gaps in research equipment; ii) serve as the Limited Competitions review committee for major instrumentation programs; and iii) serve as the review committee for the internal equipment fund (in 2.B). Members will have staggered terms of 2 years.
Metric: Successful MRI proposals each year; equipment gaps identified are filled, enabling submission of proposals in new areas
Timeline: Committee identified Spring FY2017

Task 2.B: OVPR and LEAG will coordinate the development and annual update of a main campus Research Equipment Inventory of shared-use equipment that will include information about availability, costs, and accessibility of the equipment.
Metric: Inventory completed and use of shared equipment increases.
Timeline: Inventory completed by Spring FY2018

Task 2.C: OVPR and LEAG will reinstate the internal equipment fund (as funds are available) to repair/update key research equipment through a competitive process following guidelines established by the LEAG and publicized through the OVPR website.
Metric: Funds allocated through competitive process
Timeline: FY2017 if funds available

Task 2.D: The OVPR will invite the FAMIS Data Manager to make a presentation to ADRs and Center Directors each year to communicate the importance of keeping the FAMIS database updated with accurate information and the use of FAMIS data in determining State funding and the federally negotiated F&A (indirect) rate. In addition, the OVPR will invite representatives from PPD & PDC to make a presentation to ADRs and Center Directors regarding how to access architectural and engineering services in order to i) perform feasibility studies to convert existing non-research space to future research space; and ii) assess a PI's current space and provide cost estimates for modifications to accommodate new research equipment.
Metric: FAMIS data is deemed reliable by FSM and other users
Timeline: Spring FY2017 and ongoing

Task 2.E: The OVPR will engage with PPD and the PDC to provide input into the facilities master plan to identify future research facility needs and funding sources. The Master Plan will i) identify current research space throughout campus that is outdated

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and cannot adequately support UNM's current research needs; ii) include cost estimates and a funding model to modernize existing research space to meet UNM's current research needs and iii) include basic lab construction/facility standards for all new and modified research spaces that meet our current requirements and that allow the spaces to be easily modified in the future to meet the ever changing research requirements.

Metric: Research facility needs included in Capital Request to Legislature (based on master plan)
Timeline: Planning initiated FY19

Objective 3: Improve OVPR visibility and effectiveness in supporting research

Task 3.A: OVPR will develop a mission statement and incorporate a stronger customer service based approach. As part of this effort, the OVPR will conduct annual self-assessments of the quality and utility of existing support services and use data from the annual RSP survey to make appropriate adjustments.

Metric: Mission statement in Research Strategic Plan; perceptions of faculty assessed in annual RSP survey
Timeline: Spring FY 2017

Task 3.B: VPR and/or AVPR (with the appropriate ADR) will regularly attend department faculty meetings to hear and address research concerns expressed by faculty and communicate OVPR mission and services.

Metric: Number of meetings attended each semester; improved view of OVPR on annual RSP survey
Timeline: Spring FY 2017 and ongoing

Task 3.C: The OVPR will serve as an advocate for the research community and will continue, on a case-by-case basis, to assist and facilitate interactions with university core offices such as Purchasing, Human Resources, Safety and Risk Services, and Facilities to ensure that important research needs are met in a timely and satisfactory manner. If persistent, systemic problems are identified, OVPR will work with the appropriate member(s) of senior leadership to establish a mechanism for addressing the problems identified.

Metric: Faculty responses on the annual RSP survey indicate improved efficiency and shorter timelines for processing transactions with core offices and acknowledge value of OVPR as an advocate with these offices.
Timeline: Spring FY2017 and ongoing.

Objective 4: Improve research IT capacity and services

Task 4.A: OVPR will provide input into Central IT restructuring process to ensure research computing needs are addressed in funding and planning. Research computing needs will be integrated into performance review criteria for relevant IT leadership and into IT program effectiveness measures.

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Metric: Faculty satisfaction with Central IT support of research increases in annual RSP survey.
Timeline: Spring FY17 and ongoing

Task 4.B: As a Center that reports directly to OVPR, CARC will develop a strategic plan to better meet the needs of their users for computing capacity and expansion of reliable user support. In the strategic plan, they will develop a strategy for ongoing support for the maintenance and refresh of core computing and data storage infrastructure within CARC that does not rely solely on OVPR resources.

Metric: Number of CARC users increases
Timeline: Spring FY17 and ongoing

Further Recommendations

An annual RSP survey is listed as a means for assessing progress toward the objectives above (a metric). This survey should be developed to align with the structure and content of the Infrastructure Survey administered by this working group to allow for longitudinal assessment of progress. The results of the survey as well as any other instruments used to chart progress on the objectives of the Research Strategic Plan should be shared publicly through the OVPR website.

Several of the units included in the Infrastructure Survey do not report directly to the OVPR. However, the results of the survey should be shared with the leadership of these units so they can use the feedback to acknowledge success and improve their practices. OVPR needs to develop close coordination with other administrative offices that affect research success even though OVPR does not have managerial responsibility over them and ensure these other units are fully aware of the impact of their processes on the research enterprise.

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Appendices

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Appendix 1. Abbreviations used in this report.

Abbreviation	Entity name
BBER	Bureau of Business & Economic Research
CARC	Center for Advanced Research Computing
CARF	Castetter Animal Research Facility
CASAA	Center on Alcoholism, Substance Abuse, and Addictions
CBF	Cell Biology Facility of the Biology Facility
CBME	Center for Biomedical Engineering
CEET	Center for Emerging Energy Technologies
CEPR	Center for Policy Evaluation and Research
CETI	Center for Evolutionary and Theoretical Immunology
CGA	Contract and Grant Accounting
Chem.-facilities	Department of Chemistry analytical facilities
CHTM	Center for High Technology Materials
CMEM	Center for MicroEngineered Materials
COI	Conflict of Interest
COMP	Office of Research Compliance
CRS	Center for Regional Studies
CSI	Center for Stable Isotopes
CSWR	Center for Southwest Research and Special Collections
CWE	Center for Water and the Environment
DataONE	Data Observation Network for Earth
ECISD	Export Control & Industrial Security
EDAC	Earth Data Analysis Center
FRDO	Faculty Research Support and Development Office
FRI	Feminist Research Institute
GPS	Geospatial & Population Studies
HESS	Health, Exercise & Sports Sciences Dept. Johnson Center Facilities
HR	Human Resources
IACUC	Office of Institutional Animal Care and Use Committee
IMS	Institute of Medieval Studies
IOM	Institute for Meteoritics
ISR	Institute for Social Research
IT	Information Technology
LAII	Latin American & Iberian Institute
LARF	Logan Hall Animal Research Facility
MBF	Molecular Biology Facility of the Biology Department
MMC	Maxwell Museum Collection
MSB	Museum of Southwestern Biology
OGCR	Office of Government and Community Relations
OIRB	Office of Institutional Review Board
OSP	Office of Sponsored Projects
OVPR	Office of the Vice President for Research

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PAIS	Building Plans for Physics, Astronomy, and Interdisciplinary Science Bldg.
PDC	Planning, Design, & Construction
PPD	Physical Plant Department
PUR	Purchasing Department
RCR	Responsible Conduct of Research Training Program
RWJF	RWJF Center for Health Policy
SFS	Sevilleta Field Station
SHRI	Southwest Hispanic Research Institute
SRS	Safety and Risk Services
Stats	Statistics Consulting Clinic
STC.UNM	formerly the Science and Technology Corporation @ UNM
UCAM	University Communication and Marketing

Appendix 2. Survey
The faculty survey, conducted through the Opinio esurvey system, November 16 – December 2, 2016.

Survey form and results available for download from: http://research.unm.edu/rsp-reports-presentations

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Appendix 3. References cited in this report.

Environmental Scan Working Group. 2016. Environmental Scan Draft Report, 22 November. Janie Chernak, Chair. Office of the Vice President for Research. University of New Mexico.

Research Study Group. 2007. Report of the Research Study Group. Carlton Caves, Chair. University of New Mexico.

Appendix 4. General questions to guide interviews with key personnel at research infrastructure units.

1. Can you describe the population of researchers that are served by this unit?
2. How does this unit contribute to success of researchers at UNM?
    a. How do you measure your impact on research success?
    b. What policies and best practices does this unit employ that work well and contribute to its success?
    c. Can you think of any examples of successful efforts or positive impacts of this unit that you would like to highlight?
3. In what ways could this unit perform better?
    a. What would you change or do differently if there were no constraints?
    b. What are the major constraints or barriers to the effectiveness that are faced by this unit?
    c. Can you think of any examples that illustrate barriers to success or potential problems?
4. How do you feel about the level of staffing and quality of staff support in this unit?
    a. What training, retention, and recruitment efforts does this unit have in place?
    b. What specialized skills are required for staff in this unit?
    c. Are you able to recruit people with these skills?
    d. Do you pursue a customer service approach in interactions with researchers?
        i. If so, how?
        ii. If not, why not?
5. Are researchers' expectations from this unit reasonable given its access to support and resources?
6. How do you feel about the relationship of this unit with higher administrative units at UNM?
7. Would you recommend any change in the administrative structure within or above this unit?
8. Do you have any feeling for how this unit compares to analogous units at peer institutions?

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Appendix 5. Interview Summaries

1. Summary of Interview with Stacy Kaneshige, Space Management
Interview conducted by Joel Straquadine and Mary Jo Daniel
12/08/2016

Space is an institutional asset that is increasingly expensive to maintain and build. Space Management collaborates with numerous departments and initiatives to support maximizing UNM's space and is committed to the effective and efficient use of that space. Space Management provides resources and data for various UNM reporting needs. They support the Indirect Cost Proposal (F&A), Building Renewal and Replacement (BR&R), Accreditations, etc., using industry standards and best practices. The primary tool used for tracking use of campus space is the FAMIS database (Facilities Asset Management Information System). Every unit has at least one individual with responsibility for providing accurate data via the space survey. Those data affect funding from the state level as well as determining federally negotiated F&A (indirect rate), which also impacts funding to the university and distribution of university resources, such as maintenance. When space is remodeled into a different type of space, this should be reflected in FAMIS but the Space Management unit is often not informed of changes. Users of FAMIS are frequently not fully trained and may not be aware of the implications of data being incorrectly entered.

Staffing of the unit is low; others using the same system have up to 6 times as many employees. The university does not have a policy requiring units complete and maintain accurate space surveys, leading to incomplete data that could negatively impact funding. All buildings on campus are now in the FAMIS system and there is an opportunity to link systems to provide more efficient, effective management of physical resources.

2. Summary of Interview with David Penasa, Engineering and Energy Services and Space Planning
Interview conducted by Joel Straquadine and Mary Jo Daniel
12/09/16

Engineering and Energy Services works with researchers across campus to provide the physical facilities they need to conduct their work. They respond to requests for new facilities and upgrades of existing facilities; they do not identify needs in advance. They can provide preliminary designs and recommendations on new construction and upgrades and provide technical feedback to UNM as well as review designs from contractors to ensure university construction standards are met.

The complex construction and renovation tasks in which they engage entail numerous variables so meeting tight timelines is not seen as important as getting a job done correctly. When this unit is successful, UNM researchers have laboratory facilities that meet their needs and, as a result, UNM is able to recruit and retain successful researchers. Staffing levels are seen as adequate at this time, however, many are at or

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near retirement age and there are concerns that identifying well-qualified staff in the future will pose a challenge.

This unit can provide recommendations about more efficient and effective use of space, especially if consulted early. In all construction or renovation projects, there is a trade-off between short-term cost savings and building for flexible use of the space in the future.

3. Interview with Mark Emmons, Associate Dean, University Libraries
For the Research Infrastructure Working Group
Interview 11/30/16 by Mary Jo Daniel and Linda Petree

University Libraries (UL) supports faculty and students from all disciplines in conducting both primary and secondary research. Research Data Services, a part of UL provides specialized assistance in managing and archiving data. UL collections include journals, books, and other resources that are needed for sponsored research, unfunded scholarship, dissertations and theses. Based on surveys conducted every 3 years, UL finds faculty and students value the collections and are always asking for more. UL recently launched a collaborative research space in Centennial Library and has created communal study spaces for students.

UL works hard to manage its limited financial resources well, including purchasing multi-year packages of journal collections and participating in consortia to increase buying power. UL has subject area librarians who build connections with faculty in specific departments to provide assistance in teaching and research and there is a fundamental focus on customer service. They have been rated nationally as 60th out of approximately 120 university libraries in their category.

The largest challenges faced by UL are related to financial constraints. Costs for collections continue to increase; users of print books (e.g., humanities) are likely to be impacted first, but if major journal collections are cancelled, this will impact STEM research areas. Staff and faculty positions have also been lost, leading to personnel being “stretched thin” and could lead to reduced operating hours for the libraries. When UL is able to hire, they find qualified staff locally and recruit nationally for faculty positions. Generally, salaries are competitive, training is adequate, and UNM is seen as a desirable work location so retention has not been a problem. The slow process of approving faculty contracts has resulted in the loss of good candidates for faculty positions.

4. Interview with Rosa Gonzalez Director of Sponsored Projects (Preaward and CGA) and Julian Sandoval Chief Financial Services Officer (payroll, OSP, finance systems management group)

15 December 2016; Interview conducted by Katie Witkiewitz & Stephen Cabaniss

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Summary: The Office of Sponsored Projects (OSP), including preaward and Contracts and Grants Accounting (CGA), performs a critical function for all UNM main campus researchers, including faculty, staff, and students on main campus, as well as the branches. Results from the Infrastructure faculty survey identified several problems with OSP and CGA, with several faculty expressing frustration with the functioning of these offices. During our interview with Rosa and Julian there was some recognition of the issues and a desire to improve the customer service orientation of OSP. Tremendous turnover in OSP has led to difficulties in training staff and providing good service to the campus community. Retention is also difficult given low pay at UNM and the high stress deadline driven environment. It was also somewhat clear that OSP is unaware of many of the difficulties in conducting sponsored research at UNM given the clear disconnect between the faculty survey comments and the acknowledgment of problems by the leaders of OSP.

5. Center for Advanced Research Computing (CARC) Interview Summary
Interview Date: 12/6/2016
Interviewer: Karl Benedict
Interview With: Patrick Bridges, Interim Director of CARC and Associate Professor of Computer Science
The Center for Advanced Research Computing supports researchers across main and north campus in a wide variety of disciplines, primarily in STEM fields, but with a small but growing number of social sciences, arts and humanities researchers. These research users range from individuals to research teams, and consist of approximately ± 10 consistently heavy users every week with dozens of additional users running smaller jobs on CARC systems. Their overall user based is about 50-100 regular users. In support these researchers CARC provides a variety of research computation services including CPU-intensive, large memory, GPU, and capacity computing ("embarrassingly parallel"). These computational services are complemented by providing large-scale storage support.
In support of these services CARC's strengths in research support include providing researchers with application development support in developing and implementing solutions within CARC's systems to "get researchers to results". This approach is based upon a model of starting work "where the researchers are" and working with them to transition their workflows into CARC's environment for execution at scale. Another strength (and weakness - see below) is that these services are provided without required costs to researchers, significantly lowering the barrier to entry for using CARC systems for research.
Areas for improvement in CARC's research services include expanding the number and diversity of users in the system while developing a funding model that provides sustainable services in the face of increasing demands for those services. In conjunction with increasing system demands as CARC's user base grows is an ongoing requirement for hardware and software maintenance and replacement - a capital cost for which the current direct funding model from the OVPR is not sufficient. One potential solution that was discussed in response to this funding challenge is adopting a "freemium" model in which a base level of services is

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provided without cost to researchers, but higher tiers of service are provided for a fee to help cover the ongoing costs of maintaining and replacing CARC's systems. Another area for improvement, also associated with increasing demands for CARC services is expansion of application development support capacity through hiring of two more application developers. While this is a needed area of growth for CARC, two factors limit CARC's ability to expand their staffing to meet support demands: funding for positions and competition (particularly in terms of salary) from the National Laboratories and NM Consortium for the limited number of individuals with the combined computational and disciplinary expertise required to support researchers in effectively transitioning their researchers into CARC's environment.
CARC uses a number of strategies for capturing feedback on the services it provides in support of research. These include a recently created *internal advisory board* of users and others from around the UNM campus; a help ticket system into which support, use and usability questions are submitted and tracked; an *executive committee* that includes UNM Associate Deans for Research; and informal feedback provided by PIs. While not yet implemented CARC has begun internal discussions on the creation of a user survey that they hope to release next year. The feedback captured through these methods is used both in the near term (especially from the help tickets) and for strategic planning and implementation.
Given its support role for individual researchers and research teams, key measures of success include publications and submitted/awarded grants by researchers supported by CARC. Additionally, CARC's support for graduate student research is measurable through the number of degrees awarded to students who used CARC capabilities as part of their research program.

6. Interview with Thomas Turner, Associate Dean for Research, College of Arts & Sciences
Interview 12/06/2016 by Christopher Witt and Jennifer Kavka
The College of Arts & Sciences (A&S) is the largest and most diverse research unit on campus consisting of about 450 faculty – 70% of which are considered highly research active. A&S' primary research mission is to support, develop, and advocate research and scholarship within it's community. Researchers interest's in A&S range from the humanities to natural sciences and contain complex differing research needs. There is a deep tradition and culture of collaboration in integrated research, scholarship, and education among A&S faculty and A&S researchers have established partnerships with every College, School, or Center on campus.
A&S supports its research mission using funds from returned overhead generated from grants
and contracts awarded to faculty in the College. The amount returned quarterly comes from the Vice President for Research's (VPR) office and varies based on the amount withheld from the VPR to cover their operational costs (top slice model). From these funds, A&S provides seed funding for their faculty (including subvention funding, research funds, and funds for an undergraduate research initiative), salary support for Faculty Research Support Officers who assist their constituents with proposal preparation and submission, start up packages for new faculty, retention packages for

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current faculty, as well as support for core research facilities on campus (including staff salaries and equipment).
The current challenge faced by the College is the reduced amount of resources being returned
to the college from the VPR due to the implementation of the top slice model. This has negatively affected the College's ability to provide adequate start-up packages and retention
packages as well as inhibited its ability to provide adequate amounts of staff support to assist
with post award management. Because of the top slice structure, Category III centers have
become rivals for dollars rather than entities for collaboration. Presently, the college is expected to provide start up funds for category III center faculty yet receive no return on their investment as overhead generated from category III center faculty does not come back to the College. If category III centers contributed to start-up packages or gave portions of overhead return to the A&S, more productive collaboration could be achieved and inequities could be addressed.

7. The working group's general questions were answered in writing by the Division of Human Resources on 12 December, 2016, as follows:

Goal: "Make recommendations on where changes can be made to propose new ways in which we can improve our infrastructure."

1. Can you describe the population of researchers that are served by your unit?
    a. GENERAL ANSWER: The Division of Human Resources (HR) does not employ any Research Staff or Research Faculty directly within the division. However, several of HR's units serve all employees (faculty, staff, and students) of the University with regard to central HR administrative functions. These services would include research personnel.
        i. Benefits: The Benefits office supports all benefits-eligible faculty, staff, and student employees with regard to administration of benefit plans.
        ii. Employee Health Promotion: EHP serves the entire benefits-eligible UNM population with regard to health initiatives.
        iii. Client Services: Indirectly supports approximately 250 employees in various research titles. Centrally manages the departmental postings, hires and other employment functions/paperwork for the research hires. Client Services, in coordination with Labor/Employee Relations, offers consultation on employee/supervisor matters.
        iv. Compensation: Manages compensation systems, job descriptions, and salary scales for all staff employees.
        v. Employee Organizational Development: Offers standard training and customized facilitations as requested for faculty and staff.

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vi. HR Information Technology: Generates and makes available staff reports.
vii. HR Service Center: Serves as the central point of contact for all employees (faculty, staff, and students) and prospective employees.
viii. Labor/Employee Relations: In coordination with Client Services, offers consultation on employee/supervisor matters. Conducts investigations and interprets university policy and collective bargaining agreements with regard to hire type.
ix. UNMTemps & Recruitment Services: Centrally manages the departmental postings, hires and other employment functions/paperwork for any temporary or targeted research hires.

2. How does this unit contribute to success of researchers at UNM?
    a. GENERAL ANSWER: HR provides the central administrative services to employ staff researchers (faculty employment areas handle this for faculty researchers.)

3. In what ways could this unit perform better?
    a. GENERAL ANSWER: It seems that the university could perform better if we didn't have so many different areas to communicate and coordinate with when a process, policy or system needs to be changed. The university is large and there are many areas doing the same functions but for different employee types. For instance, UNM is implementing a new hiring and onboarding module that must accommodate for five different employment area types. Additionally, the university does not use the same timekeeping system across the board; some employees are on Lobotime and others use Banner Time Entry. There is no clear and consistent structure in some areas and this makes things more difficult when change must be implemented.

4. How do you feel about the level of staffing and quality of staff support?
    a. GENERAL ANSWER: For HR, we feel like we are adequately staffed. We have lost a few positions through attrition, in an attempt to reduce overall costs. We are continuously developing our staff through training and we look for processes that we can improve that help our staff perform their duties better and timelier.

5. Are expectations of this unit reasonable given its access to support and resources?
    a. GENERAL ANSWER: HR strives to be the example and meet reasonably high expectations.

6. How do you feel about the relationship of this unit with higher administrative units at UNM? Would you recommend any change in the administrative structure within or above this unit?

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    a. GENERAL ANSWER: The VP of HR reports to EVP David Harris so the VP of HR is actively involved in discussions with University Leadership. HR has a good relationship with all areas of campus and is the main contact for organizational issues, questions on policies, benefits, and employee and management matters.

7. Do you have any feeling for how this unit compares to analogous units at peer institutions?
    a. GENERAL ANSWER: HR is a key central administrative unit and typically reports to the highest level staff administrator under the President, which is where we currently reside.

Appendix 6. Acknowledgements.
The Research Infrastructure Working Group (RIWG) wishes to thank all of the 273 faculty members who took the time to fill out the Survey on Research Infrastructure. Grace Faustino provided expert technical assistance to implement and distribute the survey. Michaela Paulette Shirley produced word clouds to help interpret the text answers regarding strengths, weaknesses, and opportunities. Ricardo Maestas provided expert logistical help to keep the RIWG on task. Finally, the RIWG thanks all of the units that were subject to evaluation in this report and their personnel, particularly the administrators who agreed to be interviewed for the sake of assessment.

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