RESEARCH STRATEGIC PLAN
FINAL WORKING GROUP REPORT
ON RESEARCH EXCELLENCE
February 15, 2017

Research Excellence Working Group Members:
Melanie Moses (Chair), Caroline Smith (Co-Chair), Vince Calhoun, Julie Coonrod,
Kathryn McKnight, Mary Anne Newhall, Christine Sims, Tom Turner

Table of Contents
Goals ......................................................................................................................... 2
Methods ..................................................................................................................... 2
Findings ..................................................................................................................... 4
Action Plan ............................................................................................................... 12
Acknowledgments .................................................................................................... 15
Appendices ............................................................................................................... 16

Page 1 of 110
Goals
The broad goals of the Research Excellence Working Group (REWG) were to characterize the breadth and depth of excellent research on the UNM main campus and to make recommendations to ensure that UNM continues to be one of the world's great research universities. The REWG attempted to identify the breadth of excellent research across large and small departments and centers at UNM, particularly those areas that are recognized as having significant national and/or local impact but have not been broadly recognized at UNM. The REWG also sought to highlight excellent UNM research that is distinctive, particularly research related to the environment, diverse communities, and natural and technological resources of New Mexico. The REWG also aimed to highlight interdisciplinary research, particularly research that draws from multiple schools to answer questions of national, global and regional importance.

Methods
The REWG developed frameworks to characterize the breadth of ongoing excellent research and to identify opportunities for concerted effort and investment in broad areas of UNM research expertise that relate to local, national or global research priorities. We compiled a list of 30 criteria to evaluate excellent research and surveyed chairs and directors to determine the importance of each criterion to different research units.

Data were collected and analyzed from a variety of sources to obtain both a top down and bottom up view of ongoing research activities, funding levels and opportunities. Inaccuracies and lack of critical data, such as a list of UNM publications and research products, make a complete assessment of current areas of excellence impossible. However, the data compiled and analyzed by the REWG offer a window into UNM research activity and areas of excellence. We have initiated what we recommend as an ongoing OVPR endeavor to identify and invest in excellent UNM research.

Data Sources
1. Surveys. In the fall of 2016, the REWG surveyed 100 department chairs and center directors from all main campus schools and colleges and received 49 responses. Participants were asked to:
   - identify excellent and distinctive research in their unit or between their unit and others on or off campus
   - identify criteria that characterize such research, particularly any criteria that do not fall into the usual quantitative measures of scholarly productivity.

   They were asked to highlight where possible:
   - research that is particularly ground-breaking, innovative, creative, high-impact and/or unique to UNM
   - areas of excellent cross-cutting research that span multiple departments
   - connections between research in their unit to broad questions, themes and/or societal problems
• ways to identify excellent research in their field using qualitative criteria as well as criteria that are more easily quantified, obvious, and applicable across many departments.

Participants provided
• short lists and narrative descriptions of excellent research in each unit (Appendix A2)
• ratings of the importance of criteria to evaluate research excellence (Appendix A3)

As part of this effort, the REWG and OVPR compiled a list of research active units (departments and centers outside of departments). These units and their current chairs or directors are listed in Appendix A4.

2. Interviews. In fall 2016, the REWG interviewed 18 administrative leaders from across campus. Each was asked the following about UNM research efforts.
• What is distinctive about research at UNM?
• What stands out as excellent cross-cutting research?
• Can you identify organizational structures or best practices that have led to excellent and distinctive research?

The interviews also sought future opportunities for supporting research excellence.
• Can you identify untapped opportunities for excellent research?
• Can you suggest creative ideas for obtaining research funding?
• What non-obvious criteria can help capture excellent research?

Interview questions and a detailed summary of interview responses are listed in Appendix B. The summary is organized to highlight the breadth of research under the Breaking Barriers/Creating Connections framework, large interdisciplinary research areas that are potential areas of investment by the OVPR, and recommendations from interviews.

3. Quantitative data analysis. The following data were collected and analyzed to characterize levels of research activity across UNM departments. Methods to analyze the data, and tables highlighting key elements of the data appear in Appendix C. Because data from each source were categorized differently, and many programs do not fall neatly into different departments or administrative units, many assumptions are made in order to provide a summary. The assumptions are also described in Appendix C. These data should not be interpreted without considering those assumptions and simplifications.
• Research expenditures by department from [fall 2015 – summer 2016] from the Office of the Vice President for Research
• Graduate students per department or program [fall semesters 2014 – 2016] from Graduate Studies
• Numbers, titles, and abstracts of dissertations and theses [2009 – August 2016] from the UNM Library
• Numbers of faculty per department on Main Campus, as of September 2016, from Faculty Contracts

4. Summary of prior reports and surveys. Many previous efforts have solicited information, summarized research activities and priorities and made recommendations for improvement. These efforts include the A&S hiring plans, ADR 2015 surveys, Community Engaged Research Plan, Provosts 2013 Interdisciplinary Report, 2016 Small Business Initiative Economic Development Report. Links to summaries of these reports are summarized in Appendix D.

Findings
Several themes emerged from interviews and surveys. First, faculty (particularly those outside of STEM disciplines) advocate that the breadth of excellent research across the diverse colleges of the campus be recognized, publicized, and evaluated according to criteria appropriate for each discipline. Second, more should be done to recognize the importance of interdisciplinary research, community-engaged research, and research that reflects the experiences and interests of UNM’s diverse students and faculty. One of the distinctive characteristics of UNM is that it is the only flagship university in the country that is also a Hispanic-Serving Institution. By acknowledging the diversity of excellent research across the main campus colleges, UNM can draw upon its unique strengths to continue to be one of the world’s leading research universities.

In the following sections, we identify criteria to evaluate excellent research (section 3.1) and then characterize research excellence on UNM Main Campus in terms of the breadth of excellent research and opportunities for large interdisciplinary research efforts (section 3.2), and quantitative measures of research activities (section 3.3).

Criteria to evaluate excellent UNM research
The REWG identified 30 criteria to evaluate research excellence, organized into eight categories: Research Products, Novelty & Creativity, Recognition, Student Involvement, Extending UNM Research Visibility, Community Engaged Research, Diversity, and Interdisciplinarity.

The 49 department chairs and center directors who completed the REWG survey identified several criteria as important across most disciplines. On a scale of 1 (not important) – 5 (very important), these criteria had a median rating of at least 4 (important): the quality and quantity of publications, novelty and creativity in research, distinctive nature of research, academic awards/distinctions and invited talks, and the number of students mentored and dissertations produced.

The responses highlight the importance of criteria that are not easily quantified, such as novelty, creativity and impact on the thinking of a field. Thus, evaluation of excellence
necessitates a process that includes human judgment and qualitative assessment to augment any automated data gathering process. Even when research products can be counted, an assessment of excellence requires integrating quantitative metrics with human expertise.

One of the most notable findings from the survey is that different departments, centers, and colleges emphasize very different criteria for evaluating excellence. Most criteria were rated very differently by different departments: more than half of the 30 criteria received all possible scores (1 – 5) from at least one respondent. Figure 1a shows the breadth of opinion about the relevance of each of the 30 criteria to each college, and Figure 1b lists the top-rated criteria by college. More details of the responses are shown in Appendix A3, both as a summary of all responses, and the responses per college.

Figure 1a: The importance of 30 criteria for evaluating research excellence identified by department chairs and center directors. 1 is not important and 5 is essential. Each point is the mean response of one college. University-wide centers are in a single category. This figure highlights that different colleges have very different assessments of which criteria are important.
An additional 30 criteria were provided by survey respondents (also listed in Appendix A3). Most of the additional criteria were specific to that particular department. Other answers indicated conflicting opinions, for example, that impact factors were either very important or not important at all; that national reputation is essential vs. that impact on local communities is most important.

Figure 1b: The most important criteria for each college. The different criteria for excellence in different schools and colleges necessitates an OVPR process for evaluating research excellence that is flexible enough to apply appropriate criteria in each research area. A “one-size fits all” model of evaluation across main campus is not appropriate.

Breadth of excellent UNM research that is Breaking Barriers & Creating Connections.
This section provides a brief overview of notable areas of research activity at UNM. It is based primarily on the survey of chairs and directors and on interviews that were conducted with ADRs and other administrators. More comprehensive information about areas of research excellence is provided in Appendix A2 in the words of the chairs and directors who responded to the survey, representing approximately half of the research-active units on main campus. Appendix B summarizes areas of research excellence as highlighted by administrators that were interviewed. Anyone interested in understanding the rich and varied research at UNM is strongly encouraged to read those appendices. The survey results were collated and assessed with respect to how different research activities contribute to Breaking Barriers and Creating Connections. Research that contributes to breaking barriers can be creating new knowledge and understanding, promoting creativity, novelty and artistic expression, breaking barriers between
disciplines, between the academy and the wider community, and between the academy and under-represented groups. Research can also create connections among different groups, particularly through interdisciplinary collaborations and community-based research.

The key result of this activity is documentation of the incredible diversity of UNM research programs that produce outstanding research. Having excellent research in such a wide array of disciplines is a hallmark of a world class research university. The Word Cloud in Figure 2 highlights key terms from survey responses, and Figure 3 shows terms that occurred in titles and abstracts of Masters theses and PhD dissertations, another indicator of areas of scholarly activity. Terms that occurred frequently in the surveys highlight several key research areas, for example: community, indigenous, environment, language, water and energy. Regional terms including Mexico, New Mexico and Southwest occur frequently. Technological terms that highlight research strengths in the School of Engineering and the natural sciences emphasized research in materials, nano-science, optics and computation including quantum computation, modeling, and simulation.

Figure 2: Word frequency diagram with larger font size indicating terms more frequently used in responses to the chairs and directors survey. A complete list of areas of research excellence from the survey appears in Appendix A.
The “Breaking Barriers and Creating Connections” framework highlights examples of excellent research including: new discoveries and solutions in science and engineering, to community engaged research in education, art and architecture that transforms lives in New Mexico and beyond, and a breadth of expertise being combined into cutting-edge interdisciplinary research. Survey responses demonstrate a stunning breadth of excellent research across the schools, colleges and centers on main campus. Fascinating research in highly funded centers and small departments, in science, engineering, humanities, arts, education, business and architecture engages the local communities of New Mexico and pushes the frontiers of human knowledge at a global scale.

The framework highlights interdisciplinary research at UNM that focuses on important problems facing New Mexico, the nation, and the world, such as: poverty, energy production, water and arid lands, health, disease and education, and issues surrounding diversity, race and ethnicity, biodiversity, environmental issues and sustainability. Much of the interdisciplinary work at UNM is conducted in collaborations with the Health Sciences Center, the Mind Research Network and Sandia and Los Alamos National Labs which have more PhDs from UNM than any other university. Examples of interdisciplinary programs include those focused on health, education and environment, including the Social Determinants of Health Collaborative, Robert Wood Johnson sponsored research initiatives in Education, and CASAA. Other areas include Bioinformatics, Race and Ethnicity, the Center for Stable Isotopes, Quantum Information, Optics, Energy, Water, Big Data and Informatics, Remote Sensing, Environmental/Spatial Research in Arid Lands and the A&S Humanities Initiative.
The framework also provided a tool for perceiving larger themes amongst the many areas of research excellence that were highlighted in survey responses. Out of this vast diversity, the REWG attempted to identify a small number of themes that re-occurred across a range of departments, centers, and colleges. We also sought to align areas of UNM expertise with local, state and national research priorities identified by the Environmental Scan. Three that seemed to stand out were a range of **social and cultural research related to the Southwest**, the field of **renewable energy**, and a variety of activities relating in various ways to the theme of **“water in the west”**. Here we highlight these three areas and demonstrate that they incorporate a diversity of activity both within and across traditional disciplinary boundaries.

**Social and cultural place-based research related to the Southwest.** Many researchers at UNM direct their activity towards topics of particular relevance to New Mexico, and more broadly to the Southwest and Latin America. The rich cultural heritage of New Mexico shapes much activity relating to the arts, humanities, social sciences, and language. This includes numerous departments across the colleges, and a number of research centers, including the highly interdisciplinary Latin American and Iberian Institute (LAII). UNM also has strengths in community-based research notably in Education, Fine Arts, Architecture & Planning, and some departments of Arts & Sciences. Museum-based research and exhibitions, and innovative place-based programs in the College of Fine Arts are other examples of creative research that draws from and serves the community. Anderson School programs work in local communities to foster economic development, for example, Innovate ABQ and the UNM Small Business Institute. There are also excellent place-based research programs relating to health and addiction, for example in CASAA, and research relating to issues surrounding poverty and diverse populations, particularly in Native, Hispanic and rural communities.

Place-based research in Education, Fine Arts, and Architecture and Planning occurs through well-defined community-engaged research missions. Architecture has one of the strongest community-based planning departments in the nation. The internationally recognized research programs of Fine Arts such as Indigenous and Latin American Arts and Flamenco Studies engage the community in performance and creativity in music, art, cinema, theater, dance and museum exhibits.

Much of the place-based research springs from the diverse student population that fosters excellent research in areas of interest to the communities we serve. For example, the College of Education is dedicated to improving conditions for New Mexico’s diverse populations by transforming teacher preparation and assessing impact in local schools and communities. Many departments, ethnic studies programs and interdisciplinary centers and institutes such as SHRI, LAII, and the Institute for the Study of “Race” and Social Justice have research missions rooted Native and Hispanic communities of New Mexico.

**Renewable energy.** UNM has high profile research in renewable energy infrastructure and technology, including materials, nanoscience and photonics in the School of
Engineering and the College of Arts & Sciences, with important connections to the National Labs. This work is enhanced by EPSCoR which is improving the infrastructure for research in energy, as well as contributing to the development of human resources needed for work in this area.

The CHTM and CMEM centers are nationally known for research in energy, materials and photonics; Chemistry and Biology are researching biofuels and multiple SOE departments are developing smart grid and solar cell technologies. UNM is well positioned in research into economic and environmental impact of different energy sources. There are also opportunities to link expertise in climate and ecological research (where Earth & Planetary Science and Biology have strong national reputations) to clean energy, particularly wind and solar that are abundant in New Mexico, and to the extractive energy industries that currently dominate the New Mexico economy.

Research in renewable energy can focus on other UNM strengths that NSF highlights as STEM research priorities: advanced manufacturing, nanotech, materials & optics and advanced computing including human-technology interaction, high performance computing, data analysis and modeling, robotics, cybersecurity, quantum computation, and the “internet of things”. Research in these areas, particularly in collaboration with the national labs and AFRL has potential to make substantial contributions to renewable energy technologies and infrastructure. Fostering a research ecosystem around materials, nanoscience and renewable energy also can contribute significantly to economic development in New Mexico.

**Water in the west.** Obviously a topic of great regional importance, research in this area can also be seen as “place-based”. It draws on broad expertise at UNM surrounding water scarcity in the arid Southwest and its effect on policy, the environment, and communities. Thus this area of research relates not only to those seeking solutions to water scarcity through engineering, natural sciences, planning, landscaping and Sustainability Studies, but also those who model its implications computationally, who explore it in art, who study its consequences throughout history and across different communities, and who work to develop policy dealing with this pervasive issue.

This cross-disciplinary research area has participation from Biology, Earth & Planetary Sciences, Economics, Geography, Civil Engineering, and Water Resources Program, Architecture and Planning, the Utton Center (Law) and the Center for Water and the Environment. The NSF-funded Women, Work, Water Initiative draws from this expertise to explore the role of the humanities in scientific research, introducing narrative and visual arts to the sciences while introducing data concepts to humanities faculty and students. Water in the west has been recognized as an opportunity for a cluster hire for years.

Specific examples of UNM expertise in this area include research into acequias, water systems, and planning and design in arid lands; Art and Ecology programs including Land Arts of the American West; studies of the stresses produced by climate change in
Latin American Societies related to water supply, flooding and reduced or altered agricultural productivity; effect of water on ecosystems, disease ecology and health informed by state-of-the-art microbiology and gene sequencing facilities; sustainability studies, including cross-disciplinary food inquiry; improved climate models through use of high performance computing and remote sensing in collaboration with the national labs; Archeology of the Southwest and Mexico related to land-use, water use, and climate change. There is great potential to link research strengths in water problems and remediation to UNM research leadership in climate, arid ecosystems and ecology research.

**Quantitative data on research activity**

Our analysis highlights certain departments that stand out as having particularly high numbers of graduate students, numbers of faculty, dissertations produced, and external research funding levels. The data that were assembled for this report are included in Appendix C. Notably absent is any measure of scholarly productivity or metrics of quality because these data have not been collected.

The largest faculty are in Biology and Electrical & Computer Engineering (which also has one of the largest graduate student populations). Particularly large graduate student populations are in the College of Education, the School of Public Administration, the School of Engineering (Computer Engineering, Computer Science, interdisciplinary programs) and the College of Arts & Sciences (Anthropology and Biology, although Psychology stands out as producing large numbers of theses and dissertations). The graph below highlights the varying ratios of faculty to graduate students across departments; those with very high numbers of graduate students but relatively small faculty numbers warrant investment in additional faculty lines. [Note that these numbers include only those faculty and students specifically associated with programs within departments; interdisciplinary programs are excluded.]

![Graph: Number of graduate students and number of faculty per department](image)

*Figure 4: Number of graduate students and number of faculty per department*
Substantial research funding is awarded to centers, particularly those affiliated with the OVPR (EPSCoR, CASAA, CHTM, CMEM) and the School of Engineering. The top units in terms of research funding, with annual expenditures (in order) between $12 and $3 million dollars are EPSCoR, Biology, Continuing Education, Electrical and Computer Engineering, Computer Science, Center on Alcoholism, Substance Abuse and Addictions (CASAA), Institute of Meteoritics, Center for High Tech Materials (CHTM), Center for Micro-Engineered Materials (CMEM), Physics & Astronomy, Chemistry, and the Center for Water and the Environment.

**Action Plan**

Based on the above findings, the REWG identified five strategic objectives to increase excellent research at UNM. The first two are to improve the research infrastructure and develop a culture that supports research excellence by incentivizing, rewarding and communicating research excellence and by developing a culture of trust, inclusion, cooperation and collaboration. These recommendations are addressed in the Infrastructure and Human Capital reports. In addition, we suggest that UNM embark on the following three strategic objectives and associated tactics to achieve the goal of assessing, enhancing and recognizing research excellence across the diversity of research programs across campus.

**Objective 1: Develop a mechanism to assess and communicate research excellence across the diversity of research programs on campus.**

**Task 1.A.** The OVPR will provide input for the Provost’s Office as they are in the process of developing a mechanism of collecting faculty information to create an annual summary of scholarly and creative activities on campus. As the findings of this report suggest, the summary should provide research excellence criteria measurements, as defined by the Dean of each college, and recognize that these criteria may be different between colleges. Following the collection of the data, the OVPR will work with the ADRs to analyze the data with respect to the diversity of research and will distribute a report to university leadership, faculty listservs and will post the report to the OVPR website.

**Metrics:** Enhanced awareness of research activities as assessed on an annual basis through a research strategic plan (RSP) survey. Increased engagement with UNM upper leadership regarding the breadth and depth of excellent research taking place at the institution.

**Timeline:** The data gathering process will be prototyped during the spring of FY2017. Full data collection and the analysis of data will take place during the spring of FY2018. The first report of Research Excellence will be completed and distributed late spring FY2018.

**Task 1.B.** Following the OVPR/ADR analysis of the scholarly and creative activities on campus, the OVPR will work with ADRs/Center Directors to identify cross-cutting areas of research strength. The findings of this analysis will be posted to the OVPR website.

**Metrics:** Cross-cutting areas of strength will be identified and publicly recognized on the OVPR website.
Timeline: Full data collection and the analysis of data will take place during the spring of FY2018. The areas identified as cross-cutting areas of research strength will be posted to the OVPR website spring FY2018 and annually thereafter.

**Task 1.C.** The OVPR will collaborate with the Provost’s Office with the goal of creating and publishing a searchable database with the data acquired through the annual summary of scholarly and creative activities on campus.

Metrics: Enhanced awareness of research activities as assessed on an annual basis through a research strategic plan (RSP) survey. Increased engagement with UNM upper leadership regarding the breadth and depth of excellent research taking place at the institution.

Timeline: The timeline for creation of the database will be determined by the Provost’s Office

**Task 1.D.** The OVPR will communicate, to the College Deans and Department Chairs, the identified cross-cutting areas of research strength and the areas of existing and growing research excellence to encourage and support resource allocation (including faculty hiring) directed toward these areas.

Metrics: Resource allocation, including faculty hires, will be directed toward areas of research excellence and those representing cross-cutting areas of research strength. Increases in areas identified as cross-cutting and/or excellent will be assessed on an annual basis through the RSP survey.

Timeline: The information will be distributed to Deans and Chairs spring FY2018.

**Objective 2: Develop a plan for investments into new research areas.**

**Task 2.A.** Through the process involved to create this report, the REWG identified areas of cross-cutting excellence. The OVPR will provide and communicate institutional support programs for the three areas identified by the working group. Specifically: 1) Place-based social and cultural research, 2) Renewable energy and 3) Water in the West, exploring water, environment and climate.

Metrics: The performance of the identified areas will be evaluated by June 30, 2018 to determine if the institution has realized an increase in research proposals and awards in the emerging areas.

Timeline: The initial investments into the three identified areas will be made by June 30, 2017.

**Task 2.B.** Utilizing the data acquired from the annual summary of scholarly and creative activities on campus and the subsequent analysis by the OVPR and ADRs, the OVPR will seek to identify possible new areas for investment. Resources (financial and otherwise) will be made available to existing and emerging areas of research excellence as well as cross-cutting areas identified through this process.

Metrics: The performance of the identified areas will be evaluated annually to determine if the institution has realized an increase in research activity in the investment areas.
Timeline: The evaluation of possible new areas for investment will begin spring FY2018 and continue annually corresponding with the annual summary of scholarly and creative activities on campus.

Task 2.C. The OVPR will communicate a UNM vision for research that includes the areas of cross-cutting strength, existing and emerging research excellence and investments into new research areas. The vision will be publicized via the OVPR website and the annual summary.  
Metrics: The OVPR is committed to enhancing the awareness of research activities across the campus and to communicate investments made in new research areas.  
Timeline: The UNM vision for research will be developed and publicized on the newly revised OVPR website spring FY2017. The vision statement and changes to investment areas will be updated (if necessary) annually thereafter.

Objective 3: Improve and encourage excellent interdisciplinary research.

Task 3.A. In 2013, the Provost established a committee to improve Interdisciplinary Research and Education. The OVPR will address recommendations from the Provost committee (pertaining to interdisciplinary research) by including these recommendations in the RSP Action Plan with objectives, metrics and timelines. In addition, a dedicated leadership position should be established to take charge of Interdisciplinary research initiatives, including those recommended in the human capital report, particularly:

- Articulate procedures and policies and available administrative and financial support to faculty who wish to establish interdisciplinary research programs
- Develop procedures for hiring, evaluating, and promoting faculty conducting interdisciplinary research
- Encourage "bottom up" faculty collaboration by supporting research in particular themes and problems through seed funding, allocation of grant writing support and administrative support. Encourage formal and informal exchange of ideas in interdisciplinary spaces. Build upon the newly established Interdisciplinary Research Discussion Groups in this effort and promote these groups as initial mechanisms to start research centers.
- Reward collaborative efforts, for example through financial incentives, teaching releases, or administrative support.
- Work with the Provost, ADRs, Deans and center directors to overcome existing barriers to interdisciplinary research and education including: rigid organizational structure and administration silos, department/discipline-centric hiring and promotion, inadequate funding, marginality of ID research, teaching, service, advising, and mentoring.

Metric: Interdisciplinary research will be prominent in the strategic plan for the newly developed structure, with subsequent measures of increase in interdisciplinary research.
Timeline: The timeline for individual recommendations are addressed within the RSP Action Plan.

Task 3.B. The OVPR will initiate a closer working relationship with the Office of Community-Engaged Research. The Director of the Office of Community-Engaged Research will be invited to participate as a member of the ADR/CD group and to attend meetings and discussions where opportunities for collaboration in community-engaged research can be explored. In addition, if opportunities are identified through the annual summary review process, the OVPR will communicate and collaborate with the Office of Community-Engaged Research as appropriate.

Metrics: The Director of the Office of Community-Engaged Research will become a member of the ADR/CD group and will be included in meeting and discussions with the OVPR regarding opportunities for collaboration in community-engaged research.

Timeline: An introductory meeting will be scheduled with the Director of the Office of Community-Engaged Research early spring FY2017. The Director will be invited to participate in monthly ADR/CD meetings thereafter.

Acknowledgments
The REWG gratefully acknowledges the contributions to this report of the 18 interviewees and 49 survey respondents, the OVPR staff (Grace Faustino, Carman Melendrez, Isela Roeder, Mary Jo Daniel, Monica Fishel, Stephanie Tofighi), Kevin Comerford and Karl Benedict from University Libraries, and other UNM administrative units that supported surveys and other data collection efforts. These collective efforts from staff, administration and faculty demonstrate the value of shared governance at UNM.
Appendix A1: Survey Questions

The survey questions, including the list of criteria evaluated by chairs and directors, is available here:
https://unmm-my.sharepoint.com/personal/research_unm_edu_layouts/15/guestaccess.aspx?guestaccesstoken=wl8Ced0d8h7PJfR9QRUtdz7bSq7FkLoCRGv6DDd5DEE%3d&docid=073e108aa119e45198e1e14ca54fee88c&rev=1

Research Excellence on UNM Main Campus Survey

Dear Department Chairs and Center Directors,

The Office of the Vice President for Research at UNM is in the process of developing a Research Strategic Plan. As part of that effort, the Research Excellence Working Group is charged with exploring and characterizing excellent and distinctive research at UNM. Our goal is to produce an accurate and inspiring picture of UNM research (hover your mouse here for a definition). This picture will be used to foster internal and external collaborations, leverage investments in areas of strength and potential growth, and to broadly communicate the areas of strength of UNM research. We aim to highlight the distinctive high quality research in smaller programs along with large and highly funded research programs that are more easily identified.

This survey is one among several top-down and bottom-up mechanisms to identify research excellence at UNM. Your input is crucial to mitigate the inherent difficulties in identifying excellent research across a broad diversity of programs and assessing research with objective criteria.

Please take this opportunity to use your judgement as chairs and directors to highlight excellent and distinctive research, including that which might not be evident from quantitative metrics.

Please
1. identify excellent and distinctive research in your unit or between your unit and others on or off campus
2. identify criteria with which to identify such research, particularly any criteria that do not fall into the usual quantitative measures of scholarly productivity.
3. Please use language that can be appreciated by a broad audience of academics in other disciplines as well as the external community. Please highlight the following where possible
   - research that is particularly ground-breaking, innovative, creative, high-impact and/or unique to UNM
   - areas of excellent cross-cutting research that span multiple departments
• connections between research in your unit to broad questions, themes and/or societal problems
• ways to identify excellent research in your field using qualitative criteria as well as criteria that are more easily quantified, obvious, and applicable across many departments.

So that we may summarize research at UNM under a coherent narrative, we ask you to relate research in your unit to an overall theme of "Breaking Barriers and Creating Connections". We encourage you to think broadly and to highlight how research is:

1. Breaking Barriers to new knowledge and understanding
2. Breaking Barriers between communities and the academy in community engaged research
3. Breaking Barriers to underrepresented populations and topics to promote diversity in academic research
4. Breaking Barriers in expression by fostering creativity, performance or novelty Creating Connections through interdisciplinary research efforts organized around problems or themes that transcend traditional disciplinary categories
5. Creating Connections between research and education by engaging students in research or incorporating research into the classroom and educational activities.

Your input is a vital component of the UNM Research Strategic Plan. We hope that you will embrace this opportunity to communicate the excellent research by your faculty and students to the rest of the University. Thank you for contributing your valuable time to complete this survey. Please respond by November 11, 2016.

If you have questions or need help with technical issues email: gfaustin@unm.edu
A Survey of Research Excellence on UNM’s Main Campus

You can save your responses by clicking the “Save and return later” button at the bottom of the page.

Question 1.

CONTACT INFORMATION

Q1a:  
First Name: Last Name:

Q1b:  
The department or unit for which you are chair or director:

Q1c: How long have you served in this role?

Less than 1 year ☐  1-3 years ☐  3-5 years ☐  More than 5 years ☐  
   If you have chosen "other", please specify:

☐

Q1d: How long have you been faculty at UNM?

Less than 1 year ☐  1-3 years ☐  3-5 years ☐  More than 5 years ☐  
   If you have chosen "other", please specify:

☐
Question 2.

AREAS OF RESEARCH EXCELLENCE
Please identify a small number (1 - 5) of areas of research that are excellent and/or distinctive in your unit. In each area please indicate the fraction of that research that is done through collaborations outside your unit so that we can identify cross-cutting efforts that involve collaboration with other units at UNM or external collaborators in other disciplines. (hover your mouse here for examples of cross-cutting research).

We do not expect that this short list will include all research in your unit. We encourage you to summarize areas of research excellence into efforts involving multiple faculty. Please use language that can be understood by those outside your department or center.

The short answers will be included in an appendix to the report of the Research Strategic Planning Committee. We encourage you to use the narrative to communicate whatever you think is most relevant about research excellence in your unit. You may wish to explain the short answers in more detail, or to highlight other areas of excellence in your unit. The narratives and short answers will be aggregated and summarized in the report.

Chairs, please note that we have requested input from Research Centers that cross department boundaries, but department chairs should include in your summary the activities of centers wholly within your unit.

Q2a:
Area of research excellence 1 (required) Limit: 300 characters (approx. 30 words).

What fraction of this work (if any) is done through research collaborations outside of your unit?

- none
- <20%
- 20% - 50%
- > 50%

O O O O
Q2b:
Area of research excellence 2 (optional) Limit: 300 characters (approx. 30 words).

What fraction of this work (if any) is done through research collaborations outside of your unit?

None < 20% 20% - 50% > 50%

Q2c:
Area of research excellence 3 (optional) Limit: 300 characters (approx. 30 words).

What fraction of this work (if any) is done through research collaborations outside of your unit?

None < 20% 20% - 50% > 50%

Q2d:
Area of research excellence 4 (optional) Limit: 300 characters (approx. 30 words).

What fraction of this work (if any) is done through research collaborations outside of your unit?

None < 20% 20% - 50% > 50%

Q2e:
Area of research excellence 5 (optional) Limit: 300 characters (approx. 30 words).

What fraction of this work (if any) is done through research collaborations outside of your unit?

None < 20% 20% - 50% > 50%
Q2f: Please provide a narrative describing the excellent and distinctive research in your unit? (required)

Limit: 2500 characters (approx. 250 words)
Question 3.
CRITERIA FOR EVALUATING RESEARCH
Please indicate how important each of the following criteria are in assessing research excellence in your unit. These criteria are grouped into categories for convenience, but these are not intended to be mutually exclusive. Please include criteria regardless of whether they are difficult to measure, quantify, or assess with an automated procedure.

Q3a: Research Products

<table>
<thead>
<tr>
<th></th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Important</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestige or selectiveness of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity of research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbers of publications: books, journals or other print</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of publications as measured by impact factors, citation indices, and other qualitative measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of installations,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbers of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Q3b: Novelty and Creativity in Research

<table>
<thead>
<tr>
<th>Distinctiveness or unique aspects of research or innovation and creativity of research approach</th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very Important</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research that generates new conversations, methods or approaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrable impact upon the way</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Q3c: Recognition

<table>
<thead>
<tr>
<th>Invited talks, keynote</th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very Important</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic awards, distinctions or fellowships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membership in outside organizations, e.g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Q3d: Student involvement in research

<table>
<thead>
<tr>
<th></th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students and post-docs mentored</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placement and recognition of students, e.g., subsequent graduate or postdoctoral positions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New course offering stemming from</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Q3e: Extending research visibility outside the university

<table>
<thead>
<tr>
<th></th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage in local/national/international print or online media</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High visibility collaborations with external institutions or scholars</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact on public policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Q3f: Community Engaged Research

<table>
<thead>
<tr>
<th></th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community partners engaged in design, implementation, interpretation and/or assessment of research</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Academic service learning that fills demonstrated community needs</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Outreach: numbers and diversity of community members that</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Q3g: Diversity in Research

<table>
<thead>
<tr>
<th></th>
<th>Not</th>
<th>Of Little Importance</th>
<th>Import</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers of underrepresented students and faculty engaged in research</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Numbers and diversity of students in undergraduate research opportunity programs</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Research topics focusing on</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>Number of publications</td>
<td>Not</td>
<td>Of Little Importance</td>
<td>Import</td>
<td>Verv</td>
<td>Essen</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----</td>
<td>----------------------</td>
<td>--------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
### ADDITIONAL CRITERIA FOR EVALUATING RESEARCH

Please list any criteria for evaluating research that were not previously listed, and indicate how important they are in your unit (optional).

**Q4a: Criteria for evaluating research 1 (optional)** Limit: 300 characters (approx. 30 words).

<table>
<thead>
<tr>
<th>Not</th>
<th>Of Little Importance</th>
<th>Important</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Q4b: Criteria for evaluating research 2 (optional)** Limit: 300 characters (approx. 30 words).

<table>
<thead>
<tr>
<th>Not</th>
<th>Of Little Importance</th>
<th>Important</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Q4c: Criteria for evaluating research 3 (optional)** Limit: 300 characters (approx. 30 words).

<table>
<thead>
<tr>
<th>Not</th>
<th>Of Little Importance</th>
<th>Important</th>
<th>Very</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q5: Is there anything else you would like to add about research excellence at UNM? (optional)

Limit 1000 characters (approx. 100 words)
Appendix A2: Summary of Survey of Chairs and Directors
Breaking Barriers

Breaking barriers to new knowledge and understanding

- **Accounting**: Our department has an eclectic research focus including four researchers that look at the social implication of accounting systems and who publish extensively in Europe, Australia and across North America. One, Joni Young, is considered a leading expert in regulation worldwide and works extensively with researchers at the London School of Economics. Richard Brody is a leading expert in fraud and forensics. He is called upon to speak on white-collar crime and information security across the nation. Leslie Oakes is a leading accounting historian who has published widely in both management and accounting journals. She has been an invited speaker across Canada, Australia and Europe.

- **Anthropology**: Evolutionary anthropology of the whole human organism in its ecological, social and cultural environment that inspires interaction with the social, biomedical and physical sciences.

- **Anthropology**: Multiple active research projects on past societies (from the Paleolithic through historic periods) and landscapes in a range of regional and international locations

- **Anthropology**: Theoretical/Analytic Areas of Expertise, Excellence and Distinction include: Ceramic analysis; Evolution of prehistoric agriculture; geospatial analysis; ancient agriculture and water management in arid environments; paleoanthropology; religion and emergent social complexity; museum studies, archaeological collections, cultural heritage and public museums; landscape transformation.

- **Biology**: As one of the largest academic units in the state, the 39 faculty of the Department of Biology encompass several areas of excellence. A long-standing strength is in Ecology and Evolutionary Biology, spanning many taxa, scales and perspectives. Research in the area of Biological Responses to Climate Change has focused on the effect of climate fluctuation and change on microbial, organismal, community and ecosystem processes over a range of time scales and includes connections with Geography, Earth and Planetary Sciences, and the Center for Stable Isotopes in A&S, as well as Civil Engineering. The faculty in the area of Cellular and Molecular Biology comprise another area of excellence in Biology. This area includes excellent and growing research in immunology, cell biology and development. Another area of research excellence is Phylogeny, Systematics and Biogeography.

- **The Center on Alcoholism, Substance Abuse, and Addictions (CASAA)** is a Category III center dedicated to research to reduce suffering caused by alcohol and drug use and other addictive behaviors. CASAA research is interdisciplinary, and attention to human diversity is integral to the research mission. CASAA investigators are committed to training students in research methods, and to
sharing knowledge with scientists, practitioners and individuals who are directly impacted by alcohol and drug use.

- **CASAA research breaks barriers between the University and the community** by addressing pressing problems in New Mexico related to alcohol and drugs, such as the costs of alcohol and drug use and crime, heroin and other opiate abuse, drinking and driving, alcohol use among Native Americans, and post-traumatic stress disorder among veterans.

- **CASAA researchers create connections** by collaborating with faculty in more than a dozen other departments within UNM, with more than a dozen colleges and community agencies within NM, with researchers across the United States, and with researchers in more than a half dozen other countries around the globe. These interdisciplinary partnerships address major problems in the alcohol and drug field, such as improving prevention and treatment; studying mechanisms of behavior change through the use of advanced techniques from cognitive neuroscience, psychology, and statistics; and addressing the unique needs related to alcohol and drug use of **diverse populations** such as Native Americans, Hispanics, adolescents, women, and criminal justice populations. CASAA integrates research with research training for pre- and post-doctoral fellows through institutional research funding from the National Institutes of Health.

- **CASAA:** Research to improve prevention, diagnosis, and intervention related to Fetal Alcohol Spectrum disorders and to more generally improve health outcomes for alcohol and drug using pregnant women and their babies; Research to understand the longitudinal course and processes of change in alcohol and drug use problems including changes in the brain, psychological functioning, and social relationships.

- **Center for High Technology Materials:** is committed to training the next generation of scientists, engineers, discoverers and entrepreneurs who can combine their technical training and critical thinking with excellent interpersonal and communication skills to become leaders of the 21st century. Our core strengths are: Research, creativity and innovation, interdisciplinary education, training and outreach, entrepreneurship and economic development. CHTM will continue to invent and discover disruptive technologies that can be scaled to develop innovative advanced manufacturing initiatives to create self-sustaining wealth based economies to leave the earth a better place than we found it.

- **Center for High Technology Materials:** Specific research topics include the epitaxial growth of compound semiconductor materials and devices, self-assembled quantum dots, quantum wells, nanowires, superlattices and lithographically-defined nanostructures, nanophotonics, doped and poled optical fibers, microring resonators and ultrafast optics, 2D materials and their structural, mechanical and electronic properties, application of 2D materials to flexible electronics, optoelectronics and photonics, rolled-up nanotech, bio-devices integration, materials for THz radiation, nano-scale magnetometry and MRI with
nitrogen-vacancy centers in diamond, and nanoscale thermal energy conversion. Device studies include near infrared, detectors and sources for datacomm and telecomm, avalanche photodiodes, semiconductor lasers, longer wavelength infrared sources and detectors, photovoltaics, nanofluids, GaN-based visible and UV sources, solid-state lighting and high-efficiency LEDs, visible edge-emitting and vertical-cavity surface-emitting lasers, applications of group III-nitrides to energy efficiency and renewable energy, and novel readout-circuit concepts for smart-pixel imagers. Systems related research includes advanced optical lithography, interferometric lithography, spectral sensing and imaging, molecular imaging with optically-pumped fluorophores, vibrometry using synthetic-aperture radar, ultrafast optical receivers, and microscopy. Emerging areas of research include, Anderson localization and wave propagation in random media, plasmonics, metamaterials and metasystems in the broader context of classical, quantum and computational imaging.

- **Center for High Technology Materials:** The mission of CHTM is to create and sustain a culture of excellence to promote research and education in photonics, microelectronics and nanoscale materials and devices and their applications, foster interaction between UNM, federal laboratories, industry and promote an entrepreneurial spirit for economic development with a regional focus but of global importance.

- **Center for Micro-Engineered Materials:** Materials Science & Engineering: Functional nano-materials; Nano-materials for biomedical applications; Catalytic nano-materials; Materials Synthesis and Scale Up: aerosol processing and synthesis; colloidal synthesis and sol-gel synthesis methods; hydrothermal and pyrolytic synthesis of materials; Theory and Simulation of Materials: ab-initio calculations of materials properties; molecular dynamics approaches and simulations; materials processing; layers and coatings; multiphase flow and heterogeneous phenomena at solid/liquid interface; Materials characterization and evaluation: HR-TEM, TEM-EELS, SEM-XRD; FIB-SEM, XRD, SAXS, XPS, Confocal Raman Microscopy, etc.

- **Center for Micro-Engineered Materials:** UNM Center for Micro-Engineered Materials is a materials research institute that specializes nano-materials research based on chemistry and chemical engineering synthetic approaches. Area of currently funded research endeavors are as follows (only areas totaling of $1M/year expenditures or higher are listed): 1. Novel Materials For Energy Conversion & Storage: nano-structured non-PGM catalysts for HOR/HER and ORR/ORR as well as non-carbon fuel synthesis and utilization (ammonia, hydrazine), self-regenerating PGM catalysts for low temperature oxidation and hydrogen generation. 2. Materials and catalysts for bio-driven feed-stock conversion, utilization and valuation. 3. Bio-electrochemical Systems and Bio-inspired Catalysts: microbial fuel cells, electrolyzers and water purification systems and adaptive catalysts cascades for deep oxidation of complex fuels. 4. Proto-cells: Mesoporous Materials for Drug Delivery and Therapeutics Advanced
Additive Manufacturing: technology platform based on 3D printing of functional nano-materials with feature controls at meso-scale and scale-up to macro-scale films and devices

- **Center for Micro-Engineered Materials**: Catalysis science including nano-stabilized noble metal and transition metal catalysts, electrocatalysts, and non-noble metal catalysts
- **Center for Micro-Engineered Materials**: Combined self-assembly, sol-gel, and biomimetic approaches to make new classes of biotic-abiotic materials with as yet unknown properties/phenotypes
- **Center for Micro-Engineered Materials**: Direct write technologies including 3D printing and printing of nanostructured inks along with modeling and simulation tools needed to predict and control printing
- **Center for Micro-Engineered Materials**: EDAC & SNL Cooperative Monitoring Center partnered in preparation for international arms control workshops. The workshops promote development of a friendly and working atmosphere between the two countries regarding removal of nuclear weapons from the border of countries. EDAC also assisted other international security groups within SNL to acquire imagery in a cooperative effort to improve security on the terminals, and has assisted on World Court cases concerning boundary disputes.
- **Center for Micro-Engineered Materials**: Membrane science based on combined molecular self-assembly, atomic layer deposition, and plasma processing which has resulted in ultra-thin membranes with unprecedented combinations of flux and separation efficiency
- **Center for Micro-Engineered Materials**: Nanoparticle based therapeutics based on so-called mesoporous silica nanoparticle for combatting cancer, rare diseases, and chemical and biological weapons
- **Center for Quantum Information and Control (CQuIC)**: The Center for Quantum Information and Control (CQuIC) is a small, multi-investigator research unit in the College of Arts and Sciences. CQuIC has four core faculty at UNM, all in Physics and Astronomy, one core faculty member at the University of Arizona’s College of Optical Sciences, and about a dozen associate faculty at Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL). CQuIC has developed a unique experimental capability to control the quantum state of cold, trapped cesium atoms. We can create any state in the 16-dimensional ground manifold of atomic cesium, engineer any quantum-allowed transformation between states, and verify, using techniques of quantum tomography, the accuracy with which we have accomplished these tasks. CQuIC has pioneered the analysis of quantum limitations on the sensitivity of high-precision measurements, including nonlinear quantum interferometry, complete quantum limits on the noise added by nonlinear amplification, and critical analyses of so-called weak-value amplification and probabilistic quantum metrology. CQuIC has performed a seminal analysis of the quantum entanglement that is naturally present in the ground state of a quantum spin liquid phase or a symmetry-
protected topologically ordered phase and investigated the use of this entanglement as a resource for teleportation-based quantum computation. CQuIC has participated in fundamental experimental research that explores the limitations imposed by quantum mechanics on the ability to discriminate states that are used for optical communication, for the purpose of designing reliable and efficient communication channels.

- **Center for Water and the Environment**: Assisting state and local governments with financial implications of environmental service delivery and environmental compliance (this is through the Southwest Environmental Finance Center, which is within the CWE)

- **Center for Water and the Environment**: Water resources and watersheds, Treatment technologies for water and wastewater, including wastewater reuse; Assisting state and local governments with financial implications of environmental service delivery and environmental compliance (this is through the Southwest Environmental Finance Center, which is within the CWE); Factors affecting public perception of potable reuse. Our team is investigating: (1) the impacts of forest management on hydrologic processes in headwater watersheds, (2) the impacts of watershed management and wildland fires on nutrient processing rates, and (3) the interacting impacts between watershed management and climate change on hydrologic and biogeochemical processes in headwater watersheds. We are also conducting research to address urgent needs to protect the environment and public health and to increase water reuse through the development of technologies for water and wastewater treatment. Removal of contaminants are being improved through the development of novel technologies to ‘engineer’ biofilms through the design of attachment surfaces to enrich for beneficial microorganisms. We are conducting cutting-edge research on producing high quality water with minimal energy consumption through membrane distillation. We are also investigating how educational strategies and knowledge of potential treatment scenarios’ costs affect inland communities’ acceptance of planned potable reuse through a combination of focus groups and surveys. Additional research is on energy extraction process effects on water quality. We are investigating, for example, the potential for unintentional flow through the hydrofracking wellbore systems to contaminate overlying water-bearing zones. In-Situ Leach mining of Uranium not only mobilizes uranium but other constituents such as arsenic, chromium, molybdenum, selenium, and vanadium, which have the potential to contaminate aquifers. Our research focuses on the remediation of the contaminated groundwater, including removal or immobilization of the contaminants.

- **CETI - Center for Evolutionary and Theoretical Immunology**: Theoretical Immunology (CETI), centered in the UNM Biology Department, is the one NIH Centers of Biomedical Research Excellence (COBRE) program ever to be funded on UNM’s main campus. It is now in its third and final phase of the 15 year life cycle allowed for COBRE programs. CETI plays a major role in
supporting core facilities needed for cutting edge cell and molecular biology research, particularly including modern sequencing technology. Such core facilities are vitally important to maintaining UNM's standing as a division I research university. Major thematic research foci in CETI include comparative or evolutionary immunology, and parasitology (the study of eukaryotic disease organisms). CETI investigators have made fundamental contributions to theoretical aspects of immunology in collaboration with scientists in both the UNM Computer Science Department and the Los Alamos National Lab. Research areas include: evolutionary immunology including with both theoretical and practical implications; support of modern research facilities needed for many modern biological disciplines; parasitology/tropical parasitology/parasite diversity/disease ecology. Several more experimental and applied paradigm-shifting immunological studies on a spectrum of animals ranging from molluscs to fish to mammals have also emerged from CETI.

- **Cinematic Arts:** Cutting-edge research into the links between meditation, contemplation, and cinematic creativity.
- **Cinematic Arts:** Ground-breaking research in Virtual Reality and augmented reality that can be utilized by multiple industries such as architecture and planning, medicine, and gaming. Elan Colello’s research in virtual reality is breaking barriers in new knowledge and interdisciplinary research. He heads New Mexico’s first VR festival called the, “ARVRUS Roadshow.” Among his projects are 3D mapping robots and augmented reality for first responders. Colello also runs a VR outreach program sponsored by the FilmABQ office.
- **Cinematic Arts:** The creation of Metapipe: an online service enabling artists to create high-end visual effects and animation projects by utilizing a studio infrastructure based in the cloud. Faculty member Aaron Estrada is fostering creativity. His research in the fields of visual effects and animation has led to a breakthrough known as Metapipe. This online service is revolutionary because it allows animators and VFX artists to set up a powerful and complex studio infrastructure-- including storage servers, render farm, even workstations-- entirely in the cloud.
- **College of Education Multicultural Education Center:** Addressing the social, cultural, linguistic, and educational needs of students in grades k-12 from historically underrepresented populations.
- **Communication & Journalism:** Our department brings together scholars, creative artists and practitioners working in communication, mass communication and journalism; therefore our work bridges the social sciences, arts, humanities, and professional practice. We examine and produce a wide variety of scholarly texts, diverse multi/media products, documentaries, art forms, training manuals and instructional guides.
- **Communication & Journalism:** carries out research on the following questions: How does intercultural communication research and practice during community engagement challenge and change processes and conditions of social justice,
cultural advocacy, environmental justice and health for communities? How are intersecting cultural identifications and representations produced and consumed through media, public and private discourses and what are the ideological, material and power related consequences for groups, organizations and individuals? How does the use of various technologies and multimedia journalism forms impact health interventions, political engagement and relating across lines of difference?

- **Community and Regional Planning:** In urban and planning research, spaces of everyday life and work are active areas of scholarship. The CRP faculty conducts research on informal labor markets and spaces of informal work (Jennifer Tucker, Renia Ehrenfeucht; Claudia Isaac’s also work on food systems focuses on both food access and local agriculture) and affordable housing (Claudia Isaac, Ric Richardson; Renia Ehrenfeucht has also started a project in this area).

- **Computer Science:** Computation in the Large: high-performance and distributed computing, 'big data' and analytics, volunteer computing. Computation in the Large: Current large-scale computing systems enable unprecedented amounts of data to be stored and processed, with applications in national security and in the commercial realm. However, achieving optimal performance on these varied systems remains a challenge. At UNM CS, Prof. Patrick Bridges has worked on high-performance computing operating system and network software. Prof. Dorian Arnold has worked on middleware to support data analytics. Prof. Trilce Estrada has worked on Internet-scale volunteer computing systems. Prof. Abdullah Mueen has worked on data analysis algorithms for understanding social media and other applications.

- **Computer Science:** Cybersecurity: study of technical, ethical, and social aspects of computer and communication technology. Cybersecurity: As computers and communication networks increasingly permeate our built environment and drive our society, the technical and the societal issues in their design, deployment, and operation become ever more intertwined. At UNM CS, Prof. Jed Crandall has worked on technical aspects of network security, privacy, and censorship on the Internet. Prof. Stephanie Forrest has worked on bioinspired technical countermeasures, as well as security policy issues. Other contributors to the field have included Profs. Saia, Ackley, and Stefanovic.

- **COSMIAC:** Additive Manufacturing (AM) and Micro Dispensing (MD) - Working with NASA, UTEP and AFRL on 3D printing for space and high power RF applications.

- **COSMIAC:** COSMIAC is a School of Engineering Center of Excellence that focuses on Space and Directed Energy research. A considerable portion of our portfolio is in collaboration with AFRL. We have a lot of external partners that include National Aeronautics and Space Administration (NASA), Phillips Technology Institute (PTi), Maryland Aerospace Corporation (MAI), Stinger Ghaffarian Technologies (SGT), Silicon Space Technologies, Northrop Grumman, Wyle Corporation (under FILMSS), AEgis Technologies (under D3I),
XL Scientific, and DARPA. We collaborate with many partners on our CubeSat launches. We are synergistic with many sponsored programs in the ECE Department.

- **COSMIAC**: I have completed this survey as Director of COSMIAC and only focused on projects with research expenditures at COSMIAC. A very small portion of my own research flows through COSMIAC. The vast majority of my research is part of the Applied Electromagnetics group in the ECE Department, which I started when I came to UNM in 1989. In point of fact, if you look at the FY16 expenditures in the School of Engineering, if you combine the research expenditures of Applied Electromagnetics Faculty in the ECE Department (we are 5 tenure stream faculty) with the research expenditures of COSMIAC, that totals 20% of the research expenditures for the entire School of Engineering, which comprises 99 faculty. This is an important story to tell.

- **COSMIAC**: Radiation Testing in Collaboration with AFRL - For NASA Ames and SpaceX

- **COSMIAC**: SORTIE: COSMIAC’s 2nd 6U Satellite

- **COSMIAC**: W/V Band Propagation for NASA

- **Earth Data Analysis Center**: Applied Research & Services since 1964; 100% self-sustaining, provides UNM with revenue and partnerships opportunities;

- **Earth Data Analysis Center**: As the primary contractor to NM Department of Information Technology, EDAC received a four-year award in support of broadband services, this was a vital part of the National Telecommunications & Information Administration’s, which helps to expand NM’s broadband access to communities lacking quality Internet service. EDAC supports the broadband efforts by providing a skilled team of geographic information system professionals, while leveraging investments NM has made in the Resource Geographic Information System (RGIS) program. The project objectives: acquire, process and analyze, model, report, and map Internet Service Provider data via interactive Web mapping application for broadband and IT services through the life-cycle of the project (nmbbmapping.org).

- **Earth Data Analysis Center**: EDAC serves as a broker between UNM’s academic units and the external communities we serve; to facilitate and stimulate collaborations between government agencies, between government and private organizations, and between universities in the region. As a Center of excellence in the GI-sciences for UNM and the State, EDAC is a well-known among Federal agencies, state, local and tribal governments, and professional societies, organizations and advisory bodies nationally and internationally. Our mission is to serve the needs of these communities by employing GI-science and technologies to retrieve, disseminate, process, and analyze remotely acquired analog and digital data relating to Earth's physical, cultural, and biological resources; with these assets, to undertake basic and applied research, technical assistance, and training activities for the public and private sectors of NM, while
strengthening student education to meet increasingly complex resource management and decision needs.

- **Earth Data Analysis Center**: EPSCoR Cyberinfrastructure: suite of services, tools, people, equipment & software connecting researchers, educators, computers, and data that facilitate collaboration and enable the generation of new knowledge beyond what any one individual could do alone. Built and housed at EDAC.

- **Earth Data Analysis Center**: Geospatial Data and Technologies—GIS/Photo/Satellite/Lidar Data Processing, Analysis, Modeling, Mapping, and Web Applications: NM National Hydrography Database; FEMA Cooperating Technical Partner for the State of New Mexico; emergency response/disaster preparedness; habitat, wildfire, flood studies.

- **Earth Data Analysis Center**: Network of research-based technology & systems; open access to geospatial data; statewide and national collaborative development of geospatial resources, methods, and standards; serves public, industry, education, government; Historic Aerial Photo (1930-present) & Satellite Archives.

- **Earth Data Analysis Center**: NM Geospatial Advisory Committee—Elevation Data Planning and Acquisition Subcommittee: EDAC leads NM’s statewide high-resolution elevation/lidar data acquisition, analysis and modeling, and facilitate data partnerships and collaborations across local, state, and federal agencies and organizations.

- **Earth Data Analysis Center**: Work with NM NSF EPSCoR, contributing to the development of successful EPSCoR proposals worth 25M$ supporting research projects and related cyberinfrastructure development in NM and collaborative research and infrastructure development between NM, NV and ID. EDAC leads the development of data management & virtual watershed components, contributing to data & model output visualization capabilities, with Dr. Karl Benedict.

- **Economics**: The department of economics has a long history of research strength in environmental, resource and ecological economics, including work in sustainable development. In the late 1960’s we began offering one of the first economics graduate program specializations in this area. The bulk of our research grants and publications each year tend to happen in this area, where we have produced numerous PhD graduates. We have regularly placed high in international and national rankings in this area. The numerous topics investigated include: climate change, biodiversity, endangered species, hazardous waste, water resources, river system management, ranch lands management, wildfire and forest restoration, agricultural pollution, energy economics, etc. Research applications include; dynamic modeling, econometrics, and simulations. As well, we have strengths in non-market valuation and primary data collection, including surveys and experimental economics. We continue to have at least 6 faculty with
primary foci in this area. This is complemented with growing strengths in public and health economics, and development and sustainability.

- **Economics:** As the primary contractor to the NM Department of Homeland Security & Emergency Management, we partner with State & Federal agencies, local communities, tribal entities, and professional associations to support the coordination, planning, and development of NM floodplain mapping. Our geospatial support services are vital to NMDHSEM's assessment, response and recovery efforts.

- **EPSCoR/DataONE:** Data Observation Network for Earth (DataONE) is the foundation of new innovative environmental science through a distributed framework and sustainable cyberinfrastructure that meets the needs of science and society for open, persistent, robust, and secure access to well-described and easily discovered Earth observational data. Supported by the U.S. National Science Foundation (Phase 1 Grant #ACI-0830944, Phase 2 Grant #ACI-1430508) as one of the initial DataNets, DataONE will ensure the preservation, access, use and reuse of multi-scale, multi-discipline, and multi-national science data via three primary cyberinfrastructure elements and a broad education and outreach program.

- **EPSCoR/DataONE:** Energize New Mexico focuses on one overarching question that has great potential to transform the research enterprise in New Mexico and to promote sustainable development: How can New Mexico realize its energy development potential in a sustainable manner? This question encompasses two interrelated components: How can the efficiency of resource utilization or extractive technologies be increased? This question focuses on use-inspired fundamental research in the areas of bioalgal fuels, solar energy, and osmotic power production from oil and gas industry produced waters. Can we sustain extractive energy development with no or minimal risk to water and environmental resources? This question focuses on geothermal energy development, uranium mining and environmental remediation, and the social/science nexus that includes dynamic systems modeling and understanding factors that affect human choice and decision-making.

- **EPSCoR/DataONE:** Environmental Informatics: promoting discovery, access, use, and sharing of environmental data via a federation of data repositories globally and the provision of data management tools and a suite of repository services.

- **EPSCoR/DataONE:** New Mexico's Experimental Program to Stimulate Competitive Research (NM EPSCoR) is funded by the National Science Foundation (NSF) to build the state's capacity to conduct scientific research. Faculty and students from NM universities and colleges are working to realize New Mexico's potential for sustainable energy development. NM EPSCoR is also cultivating a diverse, well-qualified Science, Technology, Engineering and Mathematics (STEM) workforce and supporting a culture of innovation and entrepreneurship.
• **Foreign Languages and Literatures:** Applied Linguistics and Second Language Acquisition Pedagogy

• **Foreign Languages and Literatures:** Cutting edge research on language acquisition/pedagogy and study abroad.

• **Geography & Environmental Studies:** Finally, a number of our faculty engage in more humanistic studies in collaboration with the newly formed Spatial Humanities Working Group. This work intersects with Latin American Studies, History, and Anthropology, with a particular emphasis on the past environments of the Americas.

• **Geography & Environmental Studies:** In addition, we have a very significant area of faculty expertise in research studying Socio-Ecological Systems and Resilience at a variety of scales -- from the national and regional to the watershed and community levels. We engage with faculty in a variety of other departments to undertake large, interdisciplinary projects in this area.

• **Geography & Environmental Studies:** We are one of very few Geography departments to boast a specialization in Legal Geography, and our faculty members with this expertise engage with colleagues in CRP and with community groups to undertake significant collaborative projects that focus on spatial justice.

• **Geography & Environmental Studies:** We have a significant expertise in Geospatial Technologies including remote sensing, GIS, and spatial modeling for both environmental applications (e.g. modeling the movement of ecosystem boundaries in response to climate change and other pressures) as well as urban applications (e.g. improving algorithms for remotely detecting change in infrastructure conditions after a natural hazard). This work involves collaborations not only within the department but also with a variety of other departments on and off campus.

• **Geography & Environmental Studies:** We have an emerging expertise in health geographies, which intersects strongly with our expertise in Geospatial Technologies, as we use GIS and spatial modeling to identify/analyze disparities in health outcomes and to evaluate environmental health risks that vary from place to place.

• **History:** A final area that has recently been reinvigorated is the History of Science, Technology, Medicine, and the Environment (HSTEM) with 3 hires, two in History of Medicine and one in History of Science.

• **History:** An emergent area of excellence is medieval history with three of our four faculty serving on the boards of the Medieval Academy and editorial boards. At present, they are among the most prolific publishers of research in the department.

• **History:** The Department’s areas of excellence are Latin American history, the American West, and Comparative Women’s and Gender History. These areas of strength have been recognized by the university by the awarding of three distinguished professorships in these areas. Latin American and Iberian History faculty contribute to a number of university-wide programs, including the LAII.
• **Honors College**: Mobile game design used in curricula and diagnostics for topics ranging from language learning to ecology, undertaken by Chris Holden, a well-known national leader for inquiry into mobile learning experiences and a primary developer for ARIS, an open source, augmented reality, game design platform.

• **Honors College**: Research on the pedagogy of human rights in higher education undertaken by Sarita Cargas who has been invited to present her at international conferences and been contracted by a major press to produce a book detailing how higher education should approach teaching human rights as a discipline.

• **Institute of Meteoritics**: NASA space missions of solar system exploration. For example, we currently participate in the Mars Science Lab mission and are involved in the upcoming Mars 2020 mission. IOM is a premier research institution for study of early solar system and planetary evolution. Founded in 1944, the IOM was one of the first institutions in the world devoted to the study of meteorites. Research in the IOM focuses on a wide variety of extraterrestrial materials and takes advantage of state-of-the-art laboratory facilities housed within IOM and the Department of Earth and Planetary Sciences. The IOM meteorite collection now totals more than 1000 different meteorites, and is an extremely valuable asset for researchers worldwide. The mission of COMPRES, on behalf of its community of member institutions, is to enable Earth Science researchers to conduct the next generation of high-pressure science on world-class equipment and facilities, to facilitate the operation of beamlines and use of high-pressure Earth sciences facilities at national laboratories, to develop new technologies for high-pressure research, and to advocate for science and educational programs.

• **International Studies Institute**: Presentation of public lectures on International affairs and international planning by distinguished faculty in the US and abroad; literature, art, and cultural studies; Conference on Cultures of Exile: Conversation on Language and the Arts, October 2013.

• **Landscape Architecture**: Landscape and Infrastructure, Urban Design. The Landscape Architecture program has been engaged in research and design for alternative storm water management in the Albuquerque region. We have worked with AMAFCA to re-imagine landscapes of urban storm water detention and re-distribution. We have also done work with projects that engage the idea of the ephemeral landscape. Ideas of temporality and ephemerality have crept into the discourses of public art and landscape architecture. In exploring the role of ephemeral, transitory space, and its expression, we help to concentrate our understanding of the issues, ideas and processes of public life.

• **Language Literacy and Sociocultural Studies**: Our Department has a rich history of research with communities. We are involved in understanding areas as intense and bounded as eye movements during reading and as broad as understanding the ways in which language, culture and power are related. We have research sites in after school programs related to STEM with middle school
children and professional development projects rooted in maintaining Indigenous languages. We also research Literacy, Reading and Writing, Digital Texts

- **Language Literacy and Sociocultural Studies:** We have a sustained and positive effort in securing funding for Indigenous language learning and maintenance. The eye movement research involves understanding the psycholinguistics of reading. Our connections to teachers, schools and communities is essential and ongoing with a history of very impactful work."

- **Linguistics:** UNM faculty are experts in providing support to communities engaged in reversing the trend of threatened or dying languages.

- **Manufacturing Engineering Program:** The Mfgr Engr Prog (MEP) has had NSF ATE SCME grant funding for 8 years and $6.8M ($8.6M total with TVI/CNM components). And, the MEP had $1.4M of NSF ATE Cross-Training funding from 1998-2003 (for a total of $10M of NSF ATE funding).

- **Marketing, Information Systems, & Decision Sciences:** Online consumer surveys. Dr Catherine Roster has partnered with Dr. Gerald Albaum as well as scholars at other United States Universities in the area of online survey methodology. Consumer surveys are increasingly being delivered online. Online consumer surveys present both opportunities as well as unique challenges.

- **Marketing, Information Systems, & Decision Sciences:** 3D Virtual modeling. Dr. Nick Flor has developed software for modeling 3D virtual worlds with applications to work being done in a National Science Foundation grant on solar photovoltaics. Dr. Flor is a co-principal investigator with faculty in the school of engineering. The 3D apps are designed to provide interactive visualizations for the general public.

- **Marketing, Information Systems, & Decision Sciences:** Decision Support Systems, Information & Management, Computers in Human Behavior, & Data Base Management. Dr. Xin (Robert) Luo has published 25 peer reviewed journal articles in these areas. He works with both department faculty and international scholars. He has orchestrated the visits of numerous scholars from China. Area of Excellence

- **Materials Center for High Technology Materials:** CHTM is committed to training the next generation of scientists, engineers, discoverers and entrepreneurs who can combine their technical training and critical thinking with excellent interpersonal and communication skills to become leaders of the 21st century. Our core strengths are: Research, creativity and innovation, interdisciplinary education, training and outreach, entrepreneurship and economic development. CHTM will continue to invent and discover disruptive technologies that can be scaled to develop innovative advanced manufacturing initiatives to create self-sustaining wealth based economies to leave the earth a better place than we found it.

- **Materials Center for High Technology Materials:** Specific research topics include the epitaxial growth of compound semiconductor materials and devices, self-assembled quantum dots, quantum wells, nanowires, superlattices and
lithographically-defined nanostructures, nanophotonics, doped and poled optical fibers, microring resonators and ultrafast optics, 2D materials and their structural, mechanical and electronic properties, application of 2D materials to flexible electronics, optoelectronics and photonics, rolled-up nanotech, bio-devices integration, materials for THz radiation, nano-scale magnetometry and MRI with nitrogen-vacancy centers in diamond, and nanoscale thermal energy conversion. Device studies include near infrared, detectors and sources for datacomm and telecomm, avalanche photodiodes, semiconductor lasers, longer wavelength infrared sources and detectors, photovoltaics, nanofluidics, GaN-based visible and UV sources, solid-state lighting and high-efficiency LEDs, visible edge-emitting and vertical-cavity surface-emitting lasers, applications of group III-nitrides to energy efficiency and renewable energy, and novel readout-circuit concepts for smart-pixel imagers. Systems related research includes advanced optical lithography, interferometric lithography, spectral sensing and imaging, molecular imaging with optically-pumped fluorophores, vibrometry using synthetic-aperture radar, ultrafast optical receivers, and microscopy. Emerging areas of research include, Anderson localization and wave propagation in random media, plasmonics, metamaterials and metasystems in the broader context of classical, quantum and computational imaging."

- **Maxwell Museum of Anthropology**: As examples of the range of research conducted at the Museum, our Curator of Osteology is an expert on dental variability in prehistoric and modern regional populations, while our Curator of Ethnology recently hosted ten Native American artists in a week-long study of the artistic aspects of items collected from Chaco Canyon.

- **Maxwell Museum of Anthropology**: Incorporation of existing or newly acquired research collections at the museum

- **Maxwell Museum of Anthropology**: The Museum's efforts supplement the work of the Department of Anthropology, but we differ from that academic unit in two important ways. First, our work is based on the creation and maintenance of research collections for use by students and established scholars from UNM and elsewhere -- not excluding our own staff.

- **Maxwell Museum of Anthropology**: Second, we not only support student learning and scholarly research, we also consistently provide programming for the general public (K-12 and adult). As such, we are part of the public face of UNM's research efforts.

- **Maxwell Museum of Anthropology**: Finally, it is important for UNM to have ways to convince the general public that the research we do is important and interesting and worthy of their political and financial support. The Museum helps transmit that message.

- **Maxwell Museum of Anthropology**: The Office of Contract Archaeology (OCA), which is administratively attached to the Maxwell Museum, provides archaeological and related professional services to public agencies and private
clients on a contract research basis. OCA thus provides a full-time, year-round program of research into New Mexico's prehistory and history.

- **Mechanical Engineering:** Energy systems and sustainability; Multiscale mechanics of materials and fluids; Dynamics and control of robotic and complex systems; Research expertise in the Department of Mechanical Engineering spans the wide areas of thermal science, heat transfer, manufacturing & automation, materials science, engineering design, dynamic systems/controls, fluid mechanics, and computational mechanics.

- **Mechanical Engineering:** Faculty and students are increasingly engaged in interdisciplinary researches in energy, micro- and nanotechnology, and bio-engineering. Areas of distinction include integrative energy systems, multiscale mechanics of materials and fluids, and dynamic systems and control, as evidenced by recent publications in top-notch journals such as Nature Communications and Scientific Reports.

- **Museum of Southwestern Biology:** Comparative genomics of non-model organisms to include understanding the genomics of adaptation (to altitude, aridity, etc), genomic signatures of coevolution (e.g., host-parasite), and genomics of speciation, diversification and hybridization.

- **Museum of Southwestern Biology:** Environmental informatics: spatial and temporal studies of biodiversity on our changing Earth.

- **Museum of Southwestern Biology:** Identification and dynamics of emerging zoonotic and wildlife pathogens.

- **Museum of Southwestern Biology:** International organizations rely on our specimens, data and expertise to help them design and implement initiatives. MSB has built a strong reputation in the public health arena related to identifying and understanding the ecology of zoonotic diseases (e.g., hantavirus) in the western US, but also in international settings including Latin America and Asia. Because of vast spatial and temporal biodiversity data served, MSB is a key player in national and international efforts in bioinformatics, both environmental and genomic. Our activity is recorded in the number of database hits (and downloads), loans, and publications.

- **Museum of Southwestern Biology:** Investigating terrestrial and aquatic community dynamics in response to changing climates and environments.

- **Museum of Southwestern Biology:** Systematics, phylogeography, ecology and conservation of organismal diversity based on morphological, genetic and isotopic investigations.

- **Museum of Southwestern Biology:** The Museum of Southwestern Biology (MSB) provides critical infrastructure to a world-wide community of scientists, educators, public health workers, and natural resource managers by providing collections (samples) and web-accessible databases that constitute an informatics resource for understanding the complexity of planetary life and related ecosystem function on local, regional, and global scales and across time. High research activity at MSB demonstrates the increasing use of collections
(both samples and data) in environmental and biomedical research. Our collections support a tremendous number of peer-reviewed publications (nearly 200 in 2015) and attract significant grant dollars. Two collections are world-class (Mammals and Genomic Resources) and six others are the largest regional collections for the SW.

- **Music**: The internationally known John Donald Robb Composers’ Symposium has brought composers and musicians from around the world to UNM for a series of public concerts and unique learning opportunities for UNM students.

- **Office of Contract Archeology**: The specialists utilized in our research include several in-house staff (for stone tool analyses, ceramic analyses, faunal analyses and GIS work) and a broad range of outside consultants and laboratories from outside universities and in the private sector – both country-wide and, in some cases, world-wide. The several projects listed in our current Areas of Research Excellence represent high profile themes in archaeological research.

- **Peace Studies** has numerous researchable issues waiting for academic research would draw interest for cooperation from the Carter Center in Atlanta, university ties with Sweden, Norway, South Africa and the Kroc Institute, University of Notre Dame. Added value comes from an association with a leading scholarly journal such as the Journal of Peace Research.

- **Peace Studies**: Application of peacemaking through research contributes to the discourse between academia and actual ethical decision making via problem-solving workshops and research seminars.

- **Peace Studies**: Connecting cross-disciplinary research supports the further development of integrative thought. Most recently, the program participated in UNM's DK2-Data to Knowledge Interdisciplinary Research Symposium it which the program director presented on contributions to reducing risks of infectious diseases at the animal-human-ecosystems interface. This strategic framework addressed priority actions, specific objectives and outputs, cross-cutting and institutional issues. Noting that violence is a public health issue the program takes on research, policy, and practice in strategic peacebuilding education that promotes global health and health equity.

- **Peace Studies**: Lastly, peace research agendas are also supported by its participation and partnering with the U.S. State Department’s Diplomacy Lab initiatives in which it explores the contexts of working in ‘critical policy analysis.’

- **Peace Studies**: Making peace research at UNM means allowing a new milieu and tradition to emerge especially when new concepts about health and human security are developing. Moreover, it needs protection from skeptics and political pressures.

- **Peace Studies**: Peace research agenda to prevent and reduce violence-related health inequities including structural violence, gender and children, community, society, and research gaps in systematic reviews, interventions, and program evaluation.
• **Physics and Astronomy:** The Physics and Astronomy department has major research activities in astrophysics, optical science and photonics, quantum information science, and subatomic physics, with smaller efforts in biomedical physics. Highlights of our astrophysical research are the development and use of radio telescopes to study the universe. The department’s biophysics group develops microscopic techniques with resolution below the far-field diffraction limit, and with collaborators from the life sciences, studies fundamental processes in cells. Pioneering work of our quantum information group investigates how quantum physics can advance computing, communication and control of complex processes. Researchers from the particle physics group are involved in the searches for dark matter, the study of subatomic particles and cosmic radiation. Groundbreaking research efforts of the optics group target imaging and spectroscopy, the development and application of novel laser sources, and optical cooling of solids.

• **Physics and Astronomy:** The Physics and Astronomy department has major research activities in astrophysics, optical science and photonics, quantum information science, and subatomic physics, with smaller efforts in biomedical physics. These areas take advantage of opportunities for cross-cutting, interdisciplinary research, with other units at UNM, with the nearby federal laboratories and other universities as well as in large international collaborations.


• **Psychology Department:** Clinical Neuroscience: fundamental features of cognition, brain, & behavior (both cognitive & behavioral neuroscience). Clinical Neuroscience: We have a new Psychological Clinical Neuroscience Center that houses a variety of unique research projects. A few examples include tDCS projects to improve attention and learning, EEG signatures of frontal cortical function, and studies to refine the neuro-developmental model of obsessive compulsive disorder.

• **Psychology Department:** Evolutionary Psychology: mate choice, ovulatory cycle effects, hormonal influences, and social influences on pain. Evolutionary Psychology: Our department has an excellent program, in part due to the collaborations with other UNM departments (biology, anthropology). Our researchers study such topics as health related behavior (as informed by Evolutionary Psychology), genotype-environment interactions, prenatal development, early social development, self-regulation, evolutionary models of
mental disorders, individual differences in stress responsivity, mutual mate choice, ovulatory cycle effects, and intelligence - just to name a few topics.

- **Psychology Department:** Treatment for Problems with Alcohol and Drugs. Treatment for Problems with Alcohol and Drugs: We have several faculty within the department who study various aspects of this problem. For example, we have an animal researcher who examines the long-term consequences of exposure to alcohol during prenatal development on learning, memory, and social behavior. We have neuroscientists who study whether transcranial direct current stimulation (tDCS) improves smoking cessation programs. Additionally, our faculty are interested in mindfulness-based relapse prevention, the application of treatments to homeless women, and psychological treatments for opiate problems. We have several faculty with part-time appointments at CASAA as well, and these individuals study cultural adaptations of alcohol or drug treatments, self-help programs, and behavioral couple therapy. We also have a researcher who examines the role of alcohol in sexual re-victimization.

- **Spanish & Portuguese:** The Hispanic Linguistics faculty carry out research on language varieties and language change, with a particular emphasis on language contact. Areas of focus include bilingualism, phonetics and phonology, language acquisition, historical change, heritage language, grammar and grammaticalization. This research is relevant to language policy and language acquisition.

- **Speech & Hearing Sciences:** Bilingualism - clinical applications for screening, assessment, and intervention; augmentative and alternative communication (AAC); efficacy of transcranial direct current stimulation brain injury; stuttering disorders speech intelligibility, and swallowing and voice disorders. Our faculty are engaged in research activities, some with external funding and others without, that aim to improve the outcomes for individuals with a variety of communication and swallowing disorders.

- **The Utton Center** is the only center in the State focused on water law. It has developed distinctive expertise in environmental, agricultural and Native American water rights.

- **Theatre and Dance: Evaluation criteria** - Professional publication history by Ph.D. faculty; National/International Faculty productions; Faculty research in classroom, studios and productions, developing; Works performed locally with instances of national and international exposure; Historic works re-created and staged at the Joyce Theatre, and Lincoln Center, NYC and world-wide touring by the Martha Graham Dance Company; Collaboration and transmission of historic works commissioned by national centers for dance and choreography and national conservatory for dance, Paris and Angers, France; Faculty presentations at ITI sponsored by UNESCO.

- **UNM Center for Advanced Research Computing:** Computational analysis of bioinformatics data; Psychological and Medical Data Analysis; Computational Physics and Engineering; Measuring Internet Censorship and Surveillance
• **UNM Center for Advanced Research Computing:** UNM CARC-affiliated researchers conduct broad array of outstanding research whose common theme is being enabled by large-scale computation and computational data analysis. This research is highly interdisciplinary, encompassing a wide range of fields across the University. While the predominant work in this area is in fields such as biology, physics, medicine, computer science, and various engineering disciplines, the social sciences, including economic and anthropology are an emerging area, where high-end computation is making growing contributions which could have significant societal impact. In addition, research in this area is strongly tied to the local and regional research institutes, such as the DOE national labs and the Santa Fe Institute are also key elements of this research.
Breaking barriers between communities and the academy in community engaged research

- **Art and Art History:** Friends of Orphan Signs grew out of a seminar taught by Ellen Babcock about repair as an activity and strategy for artists that raised questions about history, appropriation, and relationships between creative construction and decay. The collective of artists generates artwork for abandoned city signs by working collaboratively with the public at large, especially those connected locally to the space and visibility of the signs. Their objectives are to keep open the possibility for a non-commercial, stylistically hybrid, and changing voice of collective origin and bring humor and surprise to the visual landscape of Albuquerque.

- **Cinematic Arts:** Professor Adan Avalos' breaks barriers to underrepresented populations and promotes diversity in academic research. He has been invited to discuss his research, documentary productions, and experiences as a migrant worker at the International Native and American Congress taking place in Veracruz, Mexico in June. This annual gathering brings together a collective of national and international indigenous leaders and community members working on preservation, education, and organization of indigenous rights.

- **Cinematic Arts:** The production of experimental films and cutting-edge curatorial practice that brings together UNM, New Mexico, and international communities. Bryan Konefsky epitomizes the community-based researcher. Last year, Konefsky's art collective Basement Films were invited to be artists in residence at the Center for Contemporary Art in Santa Fe (UNM students assisted in staging the gallery exhibit and workshop that were part of the residency). Konefsky's participation in the International Festival of New Latin American Cinema in Havana has inspired a Cuban focus the 2017 iteration of his Experiments in Cinema festival.

- **College of Education Multicultural Education Center:** The range of projects we house, some funded others unfunded, prove excellent and distinctive in that we work in and with the communities we serve. For instance, Academic Literacy for All (ALA), Dr. Holbrook Mahn PI, aims to enhance the educational experiences of English language learners (ELLs) through critical pedagogy and dialogue. The program promotes a methodological approach that teachers and language practitioners can use to increase students’ access to rich academic language development in the core content areas. In another example, we host an annual STEAM-H Community Learning Academy (CLA) in collaboration with the UNM Health Sciences Center (HSC) that supports teachers, parents, and other stakeholders in promoting STEAM-H teaching and learning and career paths among New Mexico's k-12 student population.

- **College of Education Multicultural Education Center:** We are a small, category II center. Although small in comparison to others, our impact is meaningful because our work is grounded in community collaboration and service, and from this perspective serves a great purpose that although not
measurable by the funds we attract, is still of critical import. This is especially true as the demographics of our nation become increasingly diverse.

- **Communication & Journalism:** Another characteristic of our work is that we are committed to involving community members in collaborative projects to ensure that they benefit from the research or creative activity, notably in the arenas of advocacy for identity groups, health, and political engagement.

- **Community and Regional Planning:** Food and water systems planning: CRP faculty blend the boundaries of basic and applied research and engaged scholarship in numerous projects that investigate the potential for systemic transformation in water use and reuse and local food systems.

- **Community and Regional Planning:** Other faculty members are engaged with research and other scholarship on water and food system transformation while simultaneously using this knowledge to contribute to New Mexico’s transformation through engaged scholarship including participatory evaluation research and applied research, as well as professional service (Claudia Isaac, Caroline Scruggs, and Bill Fleming).

- **Community and Regional Planning:** Scholarship from the CRP faculty crosses boundaries among basic research, applied research and engaged scholarship. Research projects in CRP simultaneously investigate the forces driving contemporary community and regional change and how different types of interventions influence how places change, while engaging with communities, public and private stakeholders and others who are actively working for just and environmentally sustainable outcomes.

- **Geography & Environmental Studies:** We are one of very few Geography departments to boast a specialization in Legal Geography, and our faculty members with this expertise engage with colleagues in CRP and with community groups to undertake significant collaborative projects that focus on spatial justice.

- **Language Literacy and Sociocultural Studies:** We have a sustained and positive effort in securing funding for Indigenous language learning and maintenance. The eye movement research involves understanding the psycholinguistics of reading. Our connections to teachers, schools and communities is essential and ongoing with a history of very impactful work. 

- **Linguistics:** Language revitalization and documentation - Linguistics faculty work with minority communities to preserve cultural identity and indigenous language practices.

- **Linguistics:** Signed languages are the primary languages of Deaf communities - how are these languages similar to and different from spoken languages? How can signed language research reverse the marginalization of deaf individuals? Community engaged research on indigenous signed and spoken languages breaks down barriers between these communities and the academy, and fosters diversity in the academy by creating research emphases that are relevant to minority communities.
• **Political Science:** Political Science excels in research on Campaigns and Elections.

• **Theatre and Dance:** Dance program, only undergraduate and graduate degree with a Flamenco Concentration in the world, noted by the Chairperson of the NEA (2016) as strong example of NEA goals of cultural preservation, transmission and rigor.

• **Theatre and Dance:** Embodied Dance History Studies integrated into student experiences, partnerships with: American Dance Legacy Initiative / Brown University, Martha Graham Dance Company, Two NEA funded Masterworks reconstructions and preservation projects

• **UNM Art Museum:** *UNM Art Museum 50th Anniversary Catalog.* Essays by Lisa Tamiris Becker and Michele Penhall. A survey of the museum's permanent collection and history. *Stories from the Camera catalog.* Edited by Michele Penhall and features essays by former/current UNM photography faculty and staff. Melanie Yazzie: *Geographies of Memory exhibition catalog.* Essays by Lisa Tamiris Becker and Lucy Lippard. The UNAM presents exhibitions and publications produced in house or brought in from other museums. The publications highlighted above were each produced in the past two years by the museum and accompanied exhibitions. The UNAM is a teaching museum and we seek to serve the entire University community. UNAM is a public interface for the research that occurs at UNM. To date this year 2,812 people have visited the museum. I just started as director in August and am actively pursuing collaborations/engagements with departments across UNM.
Breaking barriers to underrepresented populations and topics to promote diversity in academic research

- **American Studies:** scholarship related to migration, borders, and race/ethnicity: Native & Indigenous Studies: Our faculty and students are engaged in local, regional and transnational indigenous studies, with a particular focus on the history, legacy, and contemporary manifestations of colonialism. One area of research that has been especially productive in our unit is a focus on Native American poverty in Albuquerque and Gallup, NM.

- **CASAA:** Research to improve outcomes for persons with alcohol and drug problems by developing and testing novel treatments, researching methods to train clinicians, and testing adaptations diverse populations such as Native Americans, Hispanics, adolescents, women, and criminal justice populations. Research to better understand and to test methods to prevent harm from alcohol and drug use as well as other risky behaviors in diverse populations, e.g., drinking and driving; college student use of alcohol, tobacco, and other drugs; and college student vulnerability to sexual victimization.

- **Cinematic Arts:** Investigations relating to border art and the Chicano avant-garde. A socially engaged cinematic scholarship that promotes diversity and underrepresented imagery.

- **College of Education Multicultural Education Center:** Currently, we are working with Dr. Melanie Moses (PI, Computer Science) on the project, Computer Science for All (CSforAll) to increase the presence and learning outcomes of underrepresented student populations in the field of Computer Science.

- **Communication and Journalism:** carries out research on questions including: How do post/anti-colonial critical approaches enable analysis of transnational, national, regional and local political, cultural and social relations around such processes as multiculturalism, neoliberalism, racial hierarchization and heteronormativity? How are cultures of indigenous, Southwest, and Global South (such as Central America, Latin America and Africa) and Europe shaped, challenged and/or valorized through visual communication, discourse and media?

- **Community and Regional Planning:** Indigenous planning: CRP faculty are globally recognized scholars that have spearheaded both action and research in Indigenous planning including exploring issues surrounding community change, art and work, radical sovereignty, violence and safety. Everyday urbanisms; CRP faculty investigate the forces shaping landscapes of informal work, affordable housing, public spaces and New Mexican traditional communities.

- **English Department:** In Rhetoric and Writing, our faculty is upcoming, as the group is assistant professor heavy, but most of them are publishing ferociously on issues surrounding language use, English as a Second Language, etc.
• **History:** The reputation of the Department in terms of its study of the American West (including a concentration in Native American history) has been well established for many decades.

• **Honors College:** Role of sport and athletics in American history, particularly in the context of civil rights, investigated by Ryan Swanson, who has earned an impressive national reputation for his research on baseball history as well as the Society for American Baseball Research Award since coming to UNM in 2013.

• **Linguistics:** Language revitalization and documentation - Linguistics faculty work with minority communities to preserve cultural identity and indigenous language practices. Research on signed languages, which are the primary languages of Deaf communities.

• **Political Science:** Political Science excels in the areas of Campaigns and Elections, Minority Politics and Race, Global Politics and Policy: Conflict, Human Rights, and Latin America, Gender Politics and Women’s Rights, and Health Policy.

• **Speech & Hearing Sciences:** Bilingualism - clinical applications for screening, assessment, and intervention. Our faculty are using cutting-edge technologies and addressing important contemporary basic and applied science questions with a special emphasis on issues of cultural, linguistic, and socioeconomic diversity.

• **Spanish & Portuguese:** Several themes cross departmental research, including genre and period studies; border contact; race, gender, and ethnicity; violence and human rights; colonial studies; film; performance; and indigenous studies.
Breaking barriers in expression by fostering creativity, performance and novelty

- **Art and Art History:** Border to Baghdad is an online exchange created by UNM faculty and artist Szu-Han Ho and a colleague at the SADA Contemporary Art Center in Baghdad, Iraq. It aims to create an exchange between artists from the U.S.-Mexico border and Iraq. The project engages students and artists through exchange of information, images and ideas and centers around the medium of the score, or set of instructions for making an artwork, that each group wrote for the other and ultimately performed and shared the results.

- **Cinematic Arts:** The creation of Metapipe: an online service enabling artists to create high-end visual effects and animation projects by utilizing a studio infrastructure based in the cloud. Faculty member Aaron Estrada is fostering creativity. His research in the fields of visual effects and animation has led to a breakthrough known as Metapipe. This online service is revolutionary because it allows animators and VFX artists to set up a powerful and complex studio infrastructure—including storage servers, render farm, even workstations—entirely in the cloud.

- **Communication & Journalism:** Our department brings together scholars, creative artists and practitioners working in communication, mass communication and journalism; therefore our work bridges the social sciences, arts, humanities, and professional practice. We examine and produce a wide variety of scholarly texts, diverse multi/media products, documentaries, art forms, training manuals and instructional guides.

- **COSMIAC:** Biology Work with NASA Ames and UNM Biology Department COSMIAC Biology Faculty are launching yeast samples into deep space—coordinating activities between UNM Biologist and NASA Ames

- **English Department:** Creative Writing. The Creative Writing program has some heavy hitters in the publication arena, some of whom have more than 10 books published.

- **Materials Center for High Technology Materials:** CHTM is committed to training the next generation of scientists, engineers, discoverers and entrepreneurs who can combine their technical training and critical thinking with excellent interpersonal and communication skills to become leaders of the 21st century. Our core strengths are: Research, creativity and innovation, interdisciplinary education, training and outreach, entrepreneurship and economic development. CHTM will continue to invent and discover disruptive technologies that can be scaled to develop innovative advanced manufacturing initiatives to create self-sustaining wealth based economies to leave the earth a better place than we found it.

- **Spanish & Portuguese:** Three faculty members also publish creative work, primarily poetry and memoir.

- **Theatre and Dance:** Dance program, only undergraduate and graduate degree with a Flamenco Concentration in the world, noted by the Chairperson of the
NEA (2016) as strong example of NEA goals of cultural preservation, transmission and rigor.

- **UNM Art Museum:** *UNM Art Museum 50th Anniversary Catalog*. Essays by Lisa Tamiris Becker and Michele Penhall. A survey of the museum’s permanent collection and history. *Stories from the Camera catalog*. Edited by Michele Penhall and features essays by former/current UNM photography faculty and staff. Melanie Yazzie: *Geographies of Memory exhibition catalog*. Essays by Lisa Tamiris Becker and Lucy Lippard. The UNAM presents exhibitions and publications produced in house or brought in from other museums. The publications highlighted above were each produced in the past two years by the museum and accompanied exhibitions. The UNAM is a teaching museum and we seek to serve the entire University community. UNAM is a public interface for the research that occurs at UNM. To date this year 2,812 people have visited the museum. I just started as director in August and am actively pursuing collaborations/engagements with departments across UNM.
Creating connections through interdisciplinary research efforts organized around problems or themes that transcend traditional disciplinary categories

- **American Studies** crosses disciplinary borders by engaging with faculty in Chicano/a Studies, Latin American Studies, environmental history, and racial and ethnic Studies.

- **American Studies** faculty conducts qualitative research on national borders, human migration, labor relationships, and racial and ethnic studies. This concentration crosses several academic units, including Latin American Studies, English, and History.

- **Anthropology**: Biocultural aspects of human variation: bioarchaeology, dental anthropology; reproductive ecology, behavioral endocrinology, primate behavioral ecology; genetic and linguistic co-evolution; human population genetics; human life course and hunting/gathering societies; molecular population genetics; paleoecology of Miocene apes, humanoids; stable isotopic and dental microwear analysis; paleoanthropology.

- **Anthropology**: Linguistic anthropology; theory and history, ethnonationalism, neoliberalism, and historical consciousness; 19th century British colonialism; personhood and agency, ritual and religion, autobiographical narrative, indigenous identities; nationalist ideologies and the state; social transformations and landscapes; the licit

- **Anthropology**: Research focused upon collaborative methods, discourse and narrative grounded in attention to political economy

- **Art and Art History**: Art and Ecology is one of the newest areas of study in our department and is an interdisciplinary, research-based academic program engaging contemporary art practices. Graduate and undergraduate students develop land and cultural literacy with a conceptual foundation and a wide range of production skills, including sculpture, social practice, and digital media.

- **Art and Art History**: Decolonizing Nature: Resistance, Resilience, Revitalization is a project spear-headed by Subhankar Banerjee, Professor of Art and Ecology and Director of the Land Arts program. The gathering will bring together perspectives from the arts, humanities, religion and sciences to focus on social-environmental issues facing us in the southwest and the U.S.-Mexico borderlands.

- **Biology**: The high throughput sequencing resources in Biology and the growing interest genomics create collaborations with HSC, CARC and Engineering. A large group of faculty, including the curators of the Museum of Southwestern Biology and other Biology faculty, have established an area of excellence in Phylogeny, Systematics and Biogeography addressing a diverse group of taxonomic groups. Research in this area is also connected with the efforts in Ecology and Evolutionary Biology and the Molecular Biology Facility.

- **College of Education Multicultural Education Center**: Currently, we are working with Dr. Melanie Moses (PI, Computer Science) on the project, Computer Science for All (CSforAll) to increase the presence and learning
outcomes of underrepresented student populations in the field of Computer Science. In this work, our role is to help examine the social contexts of teaching and learning in computer science to make students' experiences culturally and linguistically meaningful and rich.

- **Communication & Journalism:** In addition to working within the broad field of communication, which is an inherently "interdisciplinary discipline" we have an international and national reputation for our research and creative activity that centers on cultures and communication. We are proud of our scholarly excellence in the study of cultures as identifications, as representations, as organizational structures, as transnational processes, as multiple, intersecting and contested, and as sites of celebration of community, heritage, and performance. We often link the study of enacted cultures with contextual contingencies such as histories, institutional policies and norms and space and place.

- **Computer Science:** Computation and Life: study of computation in nature, biologically inspired computation, and synthetic molecular computation. Computation and Life: Adaptation, self-organization, learning, and self-replication are hallmarks of life; among human artifacts, computing systems are the first to exhibit these traits. At this interface, there is potential for improving our understanding of both life and computing, and for applying that understanding to improve human health and the environment. At UNM CS, Prof. Stephanie Forrest pioneered immunocomputing. Prof. Melanie Moses studies swarm robotics inspired by social insects. Profs. Dave Ackley and Lance Williams study artificial life. Prof. Darko Stefanovic studies DNA computing with applications in biomedicine. Prof. Lydia Tapia uses robotic motion planning to understand the molecular basis of allergies.

- **Center for High Technology Materials:** Research areas of excellence include Microelectronics and Nanoscale Materials, Devices and their applications. Hospital room testbed for smart lighting, applies adaptive full color gamut lighting to health/healing in a clinical environment, involves GaN lighting sources, spectral/angular sensors, CHTM, ECE, HSC; DNA sequencing based on nanochannels with nanoporous walls. (based on nanoscale lithography, self-assembly, nanophotonic, electromagnetic resonances, of interest to Chemistry, Chemical and Biological Engineering and various departments in the HSC. Colloidal nanoparticles for biomedical applications. Of interest to Engineering, Science, and School of Medicine Departments and interdisciplinary programs: ECE, ChemBio Eng., Physics, Neurosciences, Pharmacy, Biomedical Engineering, Optical Science and Engineering.

- **CREATE (Center for Rapid Environmental Assessment and Terrain Evaluation):** CREATE conducts remote sensing and GIS based research over disciplines ranging from the Geologic and Environmental Sciences. We are heavily committed to projects on a global scale and work with scientists in China, India,
across Europe as well as in South America and Australia. We also work closely with the petroleum industry.

- **Earth Data Analysis Center:** UNM collaborations: Geography, CE, CARC, Heritage, BBER, etc.; local, state, regional, tribal and national partners; supports students through employment and research opportunities.

- **English Department:** Our interdisciplinary Medieval Studies program has faculty publishing with top presses and running national organizations. By nature of our program, we interact with other units across campus.

- **Foreign Languages and Literatures:** Cultural Studies in Seven Language Areas

- **Geography & Environmental Studies:** In addition, we have a very significant area of faculty expertise in research studying Socio-Ecological Systems and Resilience at a variety of scales -- from the national and regional to the watershed and community levels. We engage with faculty in a variety of other departments to undertake large, interdisciplinary projects in this area.

- **Honors College:** Quantitative palaeoecology, led by Jason Moore who works to understand the interplay of geological, biological, and anthropogenic processes on the preservation of ecological data in the fossil record, and to use this understanding to study the drivers of change in ancient ecosystems.

- **Honors College:** Social-ecological interactions of global food systems, particularly the recent quinoa boom, studied by Marygold Walsh-Dilley, who examines the politics of resilience building in the presence of overlapping social and climate changes with a focus on indigenous communities in Andean South America.

- **Institute of Meteoritics:** Meteoritics and planetary science. This is primarily NASA funded research, highly interdisciplinary, using a wide range of analytical techniques. UNM meteorite museum is a unique source for extraterrestrial materials.

- **International Studies Institute:** Our Fall ISI Lecture series have created a veritable environment for inter-disciplinary exchanges and collaborations, as our program also includes lectures from our own faculty.

- **Linguistics:** Models of language and language change rooted in cognitive, neuropsychological and computational frameworks

- **Linguistics:** We collaborate with faculty in other disciplines to develop models of language and of language change that are rooted in cognitive, neuropsychological and computational frameworks, and that build new knowledge and understanding of language diversity and universals. Our commitment to cognitively realistic theories and data-driven methodologies has brought us international recognition. We incorporate these research findings into our instruction to empower students with empirical approaches to understanding the relationship of language, identity and power.
• **Mechanical Engineering:** Faculty and students are increasingly engaged in interdisciplinary researches in energy, micro- and nanotechnology, and bio-engineering. Areas of distinction include integrative energy systems, multiscale mechanics of materials and fluids, and dynamic systems and control, as evidenced by recent publications in top-notch journals such as Nature Communications and Scientific Reports.

• **Museum of Southwestern Biology:** As one of the most active university-based natural history museums worldwide, UNM students are afforded world-class opportunities in biodiversity informatics, comparative biology, and cutting-edge genomics.

• **Office of Contract Archeology:** Interdisciplinary research at the Water Canyon Paleoindian site in west-central NM, embracing research about past climates, past environments and human lifeways during Late Pleistocene to early Holocene epochs (13,000-8000 years before present); Archaeological and interdisciplinary research about first agricultural developments and regional trade patterns in southern NM Tularosa Basin during the El Pase Phase (ca. AD 1300-1400); Hilltop Bison site - first evidence of bison hunting in the San Juan Basin of NM during the Middle Archaic period (ca. 3500-4200 years before present); San Luis de Cabezon Early Agricultural Period site - Interdisciplinary and archaeological research about one of the earliest maize agriculture settlements in northern NM and in the American Southwest (ca. 3200 years before present).

• **Office of Contract Archeology:** Our Archaeological research often embraces expertise and data from a broad range of collaborative fields, including: 1) Geology – (soil stratigraphy; soil micromorphology; paleohydrology; X-ray fluorescence [XRF] of geological raw materials, stone fracture mechanics, neutron activation analysis of turquoise and ceramic sherd tempers; stone raw material identifications); 2) Paleoenvironment / Paleoclimatology – (stable isotopes; studies of pollens, phytoliths & diatoms; gastropod and other faunal analyses; residue analyses); 3) Mapping and Cartography – (Geographic Information Systems (GIS) and global positional stations (GPS); total station surveying; site location modeling); 4) Physics – (Optically stimulated luminescence [OSL] dating; radiocarbon [14C] dating); 5) Digital photography and data collection – (using Android tablets in the field; Small Unmanned Aerial Vehicles [SUAV] for photogrammetry and reconnaissance surveys); 6) Human Subsistence – (Macrobotanical, faunal, palynological and protein residue analyses; analyses of starches and protein residues on artifacts)

• **Peace Studies:** Connecting cross-disciplinary research supports the further development of integrative thought. Most recently, the program participated in UNM's DK2-Data to Knowledge Interdisciplinary Research Symposium it which the program director presented on contributions to reducing risks of infectious diseases at the animal-human-ecosystems interface. This strategic framework addressed priority actions, specific objectives and outputs, cross-cutting and institutional issues. Noting that violence is a public health issue the program
takes on research, policy, and practice in strategic peacebuilding education that promotes global health and health equity.

- **Physics and Astronomy:** The Physics and Astronomy department has major research activities in astrophysics, optical science and photonics, quantum information science, and subatomic physics, with smaller efforts in biomedical physics. These areas take advantage of opportunities for cross-cutting, interdisciplinary research, with other units at UNM, with the nearby federal laboratories and other universities as well as in large international collaborations.

- **Political Science:** One of faculty, Professor Mala Htun, is the Deputy Director of Advance STEM at UNM. This project was recently awarded a $3.3 million grant from the National Science Foundation to promote the professional advancement of women and minorities in STEM fields, which includes women and minorities in social sciences. In 2015 Dr. Htun also was also awarded an Andrew Carnegie Fellowship. She was one of 32 fellows from the social sciences and humanities named in the inaugural year of the program.

- **Psychology Department:** Evolutionary Psychology: mate choice, ovulatory cycle effects, hormonal influences, and social influences on pain. Evolutionary Psychology: Our department has an excellent program, in part due to the collaborations with other UNM departments (biology, anthropology). Our researchers study such topics as health related behavior (as informed by Evolutionary Psychology), genotype-environment interactions, prenatal development, early social development, self-regulation, evolutionary models of mental disorders, individual differences in stress responsivity, mutual mate choice, ovulatory cycle effects, and intelligence - just to name a few topics.

- **Spanish & Portuguese:** Much of the literary research is interdisciplinary, meshing literary methods with approaches from history, sociology, music, and film studies. Comparative studies figure strongly in departmental research, including work that crosses the Spanish American-Brazilian border, U.S. Latino & Latin America border, and Transatlantic exchanges.

- **Speech & Hearing Sciences:** The department's mission includes an emphasis on creating and disseminating basic sciences, assessment, and intervention knowledge about communication sciences and disorders within our academic discipline and in collaboration with related disciplines. Our faculty routinely collaborate with faculty at other institutions -- University of Wyoming, Boys Town Research Hospital, University of South Florida, Temple University, University of Central Florida, University of Iowa -- and with units at the UNM Health Sciences Center (Brain and Behavioral Health Institute, Mind Research Network, Center for Brain Recovery and Repair) and UNM main campus departments (Linguistics, Spanish and Portuguese, Psychology, Special Education, Computer Science).

- **Theatre and Dance:** Interdisciplinary cross-cutting research: Membership in the Hemispheric Institute; Interdisciplinary courses with IFDM program: including dance, music, film faculty -
• **UNM Center for Advanced Research Computing**: UNM CARC-affiliated researchers conduct broad array of outstanding research whose common theme is being enabled by large-scale computation and computational data analysis. This research is highly interdisciplinary, encompassing a wide range of fields across the University. While the predominant work in this area is in fields such as biology, physics, medicine, computer science, and various engineering disciplines, the social sciences, including economic and anthropology are an emerging area, where high-end computation is making growing contributions which could have significant societal impact. In addition, research in this area is strongly tied to the local and regional research institutes, such as the DOE national labs and the Santa Fe Institute are also key elements of this research.
Creating connections between research and education by engaging students in research or incorporating research into the classroom and educational activities.

- **Art and Art History**: Students are involved in the Border to Baghdad an online exchange that engages students and artists through exchange of information, images and ideas and centers around the medium of the score, or set of instructions for making an artwork, that each group wrote for the other and ultimately performed and shared the results.

- **Cinematic Arts**: UNM students assisted in staging the gallery exhibit and workshop that were part of the Konefsky’s art collective Basement Films residency.

- **Linguistics**: We train students in language revitalization efforts. UNM is the only flagship university in the nation with the expertise needed to provide this type of training and support to students documenting one of the hundreds of signed languages worldwide.

- **Maxwell Museum of Anthropology**: Both the core Maxwell Museum programs and OCA heavily involve UNM students in their research activities, providing those students with opportunities not available at most institutions of higher learning.

- **Maxwell Museum of Anthropology**: The benefits to UNM students include not only academic credit but the chance to work one-to-one with established experts, in an intensive way, year after year. The vitas of those students will display experience and skills that make them more competitive than students who simply went through an academic program and got a degree.

- **Mechanical Engineering**: students are increasingly engaged in interdisciplinary researches in energy, micro- and nanotechnology, and bio-engineering.

- **Museum of Southwestern Biology**: As one of the most active university-based natural history museums worldwide, UNM students are afforded world-class opportunities in biodiversity informatics, comparative biology, and cutting-edge genomics.

- **Political Science**: What is distinctive is that we have a group of faculty who collaborate not only with people outside our unit but also with graduate students within political science, in each of the areas identified. That is to say that no one area is 'carried' by a single faculty member. Our centers of research excellence in political science encourage collaboration and effective junior faculty mentorship.

- **Spanish & Portuguese**: Undergraduates and graduate students are engaged in research projects with faculty members, especially in the areas of corpus linguistics and producing paleographic editions of medieval and colonial texts.

- **Speech & Hearing Sciences**: The SHS faculty has focused on the involvement of undergraduate students in research. The College of Arts and Sciences' Undergraduate Research Initiative funding has provided an important mechanism for our undergraduates, especially those from underrepresented groups.

- **Theatre and Dance**: In the arts, the studio is often the equivalent of the scientific laboratory wherein creative research questions are posed and innovation solutions and practices emerge impacting the field and society. In the performing arts, students are often directly involved with this research process. Our department
offers classes exposing people to art and art making, some have never been exposed to it. Professors in our programs are on daily research process that is not evaluated in this survey. People come with different backgrounds pushing the forward, not every student will be an artist but everyone will be a member of society.
Big Questions
What research contributions are/can be made to the following

Energy:

- **Center for Water and the Environment:** Additional research is on energy extraction process effects on water quality. We are investigating, for example, the potential for unintentional flow through the hydrofracking wellbore systems to contaminate overlying water-bearing zones. In-Situ Leach mining of Uranium not only mobilizes uranium but other constituents such as arsenic, chromium, molybdenum, selenium, and vanadium, which have the potential to contaminate aquifers. Our research focuses on the remediation of the contaminated groundwater, including removal or immobilization of the contaminants.

- **Energy EPSCoR/DataONE:** Energize New Mexico focuses on one overarching question that has great potential to transform the research enterprise in New Mexico and to promote sustainable development: How can New Mexico realize its energy development potential in a sustainable manner? This question encompasses two interrelated components: How can the efficiency of resource utilization or extractive technologies be increased? This question focuses on use-inspired fundamental research in the areas of bioalgal fuels, solar energy, and osmotic power production from oil and gas industry produced waters. Can we sustain extractive energy development with no or minimal risk to water and environmental resources? This question focuses on geothermal energy development, uranium mining and environmental remediation, and the social/science nexus that includes dynamic systems modeling and understanding factors that affect human choice and decision-making.

- **Energy Mechanical Engineering:** Faculty and students are increasingly engaged in interdisciplinary researches in energy, micro- and nanotechnology, and bio-engineering. Areas of distinction include integrative energy systems, multiscale mechanics of materials and fluids, and dynamic systems and control, as evidenced by recent publications in top-notch journals such as Nature Communications and Scientific Reports.

International Studies and Collaborations:

- **Accounting:** Joni Young, is considered a leading expert in regulation world-wide and works extensively with researchers at the London School of Economics.

- **Anthropology:** Ethnographic engagements with the histories of colonial transformation in the social systems, cultural practices, and language among indigenous peoples in North Central and South America.

- **Anthropology:** Geographical areas outside the United States in which UNM Anthropology has established excellence and distinction: Latin America (Andean zone, Mesoamerica, lowland South America); Southwestern Europe (northern Spain, southern France, Portugal); East Africa (Uganda, Ethiopia); Middle East (Israel/Palestine). Faculty also working in or collaborating with scholars in Latin
America (Honduras, Mexico, Peru, Chile, Guatemala, Belize), Europe (UK, Switzerland, Spain, France, Portugal), Canada, and Morocco.

- **Art and Art History:** Biannual participation in the acclaimed Hannibal, multimillion-dollar site-specific performance in Austria; Annual participation in Asian Theatre Education Center – Only USA representative; Instructor led research into Israeli–based dance practices; Regular flamenco instructors from Spain.

- **Art and Art History:** Border to Baghdad is an online exchange created by UNM faculty and artist Szu-Han Ho and a colleague at the SADA Contemporary Art Center in Baghdad, Iraq. It aims to create an exchange between artists from the U.S.-Mexico border and Iraq. The project engages students and artists through exchange of information, images and ideas and centers around the medium of the score, or set of instructions for making an artwork, that each group wrote for the other and ultimately performed and shared the results.

- **Art and Art History:** Decolonizing Nature: Resistance, Resilience, Revitalization is a project spear-headed by Subhankar Banerjee, Professor of Art and Ecology and Director of the Land Arts program. The gathering will bring together perspectives from the arts, humanities, religion and sciences to focus on social-environmental issues facing us in the southwest and the U.S.-Mexico borderlands.

- **CETI - Center for Evolutionary and Theoretical Immunology:** CETI has been a leader in promoting research in Africa on snail-transmitted diseases like schistosomiasis that infects 250 million people, and in development of new nasal vaccines for fish diseases and in studying new models for intracellular survival of a ubiquitous human parasite Toxoplasma gondii. CETI now works closely with the Museum of Southwestern Biology on a program to explore and reveal the world's diversity of trematode parasites.

- **Cinematic Arts:** The production of experimental films and cutting-edge curatorial practice that brings together UNM, New Mexico, and international communities. Bryan Konefsky epitomizes the community-based researcher. Last year, Konefsky's art collective Basement Films were invited to be artists in residence at the Center for Contemporary Art in Santa Fe (UNM students assisted in staging the gallery exhibit and workshop that were part of the residency). Konefsky's participation in the International Festival of New Latin American Cinema in Havana has inspired a Cuban focus the 2017 iteration of his Experiments in Cinema festival.

- **Communication & Journalism:** We are also known for the multiple ways that faculty and students work in and with communities in international, national, regional and local locations and our work that attends to enhancing justice, equity and inclusion.

- **CREATE (Center for Rapid Environmental Assessment and Terrain Evaluation):** CREATE conducts remote sensing and GIS based research over disciplines ranging from the Geologic and Environmental Sciences. We are heavily
committed to projects on a global scale and work with scientists in China, India, across Europe as well as in South America and Australia. We also work closely with the petroleum industry.

- **English Department:** In American and British Literary Studies we have strength in the 19th century, on both sides of the Atlantic, in the Early Modern period (both faculty in this area are currently on grants from the prestigious Folger Library in D.C.).

- **Foreign Languages and Literatures:** A traditional way of understanding the department’s research mission involves categorization by language (Arabic, Chinese, Classics, French, German, Italian, Japanese). In fact, both periodization and areas of interest offer perhaps a more effective means of differentiating FLL’s research fields: Applied Linguistics, Classics and Classical Reception, Early Modern Literature; Comparative Literature, 20th- and 21st-Century Literature, Film Studies, Nationalism, Global Studies and Postcolonial Studies, Women, Gender and Sexuality Studies. Carmen Nocentelli’s work on Early Modern Europe, notably her 2013 book, Empires of Love, has received important recognition with top national awards and fellowship support. Professor Francis Higginson is an internationally recognized scholar of detective fiction, jazz and food in French, African and African-American culture. Professor Lorie Brau is an emerging food studies scholar with an upcoming book of Japanese popular culture (manga) and food. Professor Monica Cyrino is a leading international figure in Classical 'reception studies' -- a field that examines how contemporary culture adapts the Classical past and Classical culture. Professor Rajeshwari Vallury is nationally recognized as a scholar on post-colonial North African literature in French. Professor Lorenzo Garcia is recognized nationally as an up-and-coming Homer scholar. Professor Susanne Baackmann is internationally known for her work on German memory and trauma studies. Our two applied linguists, Tanya Ivanova and Emma Trentman, are acquiring reputations for cutting edge research on language acquisition/pedagogy and study abroad.

- **Foreign Languages and Literatures:** Literary and Film Study in Seven Language Areas

- **Honors College:** Research on the pedagogy of human rights in higher education undertaken by Sarita Cargas who has been invited to present her at international conferences and been contracted by a major press to produce a book detailing how higher education should approach teaching human rights as a discipline.

- **International Studies Institute:** The International Studies Institute offers only an undergraduate major--one with over 220 students. Our efforts in teaching and in the lecture series is to offer opportunities for these students, as well as the greater community, to engage with international affairs, culture and scholarship. Also note that we only have one full-time faculty member who is a visiting lecturer, so expectations for research are not part of the position.
• **Latin American Programs in Education:** Research with indigenous groups in Latin America and Educational institutions in Mexico and Latin America. Several faculty in COE have been involved in this work over the years.

• **Physics and Astronomy:** The Physics and Astronomy department has major research activities in astrophysics, optical science and photonics, quantum information science, and subatomic physics, with smaller efforts in biomedical physics. These areas take advantage of opportunities for cross-cutting, interdisciplinary research, with other units at UNM, with the nearby federal laboratories and other universities as well as in large international collaborations.

• **Political Science:** Political Science excels in the area of Global Politics and Policy: Conflict, Human Rights, and Latin America.

• **Spanish & Portuguese:** Research by the literature faculty stretches from Spain to the Chicano-Latino United States, the New Mexican border region, the Caribbean, Mexico, Spanish America, Brazil, and the Philippines. Faculty members also study Colombian Spanish and Indigenous languages in contact in Peru.

• **Theatre and Dance:** International experiences and pedagogical ideas in theatre and dance.

New Mexico / Southwest:

• **American Studies:** Native American poverty in Albuquerque and Gallup, NM. Southwest/Hispano research, with a particular focus on New Mexico history and culture.

• **Anthropology:** Geographical areas in which UNM Anthropology has established excellence and distinction include the US Southwest (including Chaco Canyon) and the US-Mexico Borderlands

• **Art and Art History:** One of the most prominent research areas is the Land Arts of the American West program which is an ongoing experiment and interdisciplinary model for creative and critical arts pedagogy based on place. The program puts students in direct contact with place of the American Southwest, and with the hire of a new director this Fall, is expanding its scope to encompass a more international perspective.

• **Biology:** In addition to their specific research interests, the faculty in this area have collectively established a reputation in the area of Biological Responses to Climate Change with particular emphasis on the Southwestern US.

• **CASAA:** Research that addresses pressing problems in New Mexico related to alcohol and drugs, such as costs of alcohol and drug use and crime, heroin and other opiate abuse, drinking and driving, alcohol use among Native Americans, and post-traumatic stress disorder among veterans.
• **Cinematic Arts:** Investigations relating to border art and the Chicano avant-garde. A socially engaged cinematic scholarship that promotes diversity and underrepresented imagery.

• **Community and Regional Planning:** Everyday urbanisms; CRP faculty investigate the forces shaping landscapes of informal work, affordable housing, public spaces and New Mexican traditional communities. Moises Gonzales is one of the foremost scholars on New Mexican cultural landscapes, following in the tradition of Jose Rivera (now emeritus) who conducted groundbreaking work on Acequia culture.

• **English Department:** In American Literary Studies we have strength in research into the Southwest.

• **History:** The reputation of the Department in terms of its study of the American West (including a concentration in Native American history) has been well established for many decades and is widely regarded as having one of the strongest programs within universities in the Trans-Mississippi West. This fact accounts for the following recognition of the department’s excellence in this field: member of the Newberry Library Consortium in American Indian Studies (NCAIS), site of the 2013 Autry National Center of the American West Autry annual symposium for graduate student research.

• **Latin American Programs in Education:** Language revitalization in collaboration with Native American studies; Linguistics, COE. Culturally responsive education for marginalized groups in collaborations between COE and Educational Institutions in Mexico and Canada.

• **Maxwell Museum of Anthropology** studies and presents human cultural and biological variability, with a special focus on the peoples of New Mexico and the Southwest. That research effort spans the first people to reach the Southwest, more than 10,000 years ago, to the 20th century.

• **Maxwell Museum of Anthropology:** The traditional peoples of the U.S. Southwest

• **Office of Contract Archeology:** Interdisciplinary research at the Water Canyon Paleoindian site in west-central NM, embracing research about past climates, past environments and human lifeways during Late Pleistocene to early Holocene epochs (13,000-8000 years before present); Archaeological and interdisciplinary research about first agricultural developments and regional trade patterns in southern NM Tularosa Basin during the El Pase Phase (ca. AD 1300-1400); Hilltop Bison site - first evidence of bison hunting in the San Juan Basin of NM during the Middle Archaic period (ca. 3500-4200 years before present); San Luis de Cabezon Early Agricultural Period site - Interdisciplinary and archaeological research about one of the earliest maize agriculture settlements in northern NM and in the American Southwest (ca. 3200 years before present).

• **Spanish & Portuguese:** The Department is especially known for its research on Southwest Spanish, with the development under the direction of Garland Bills and Neddy Vigil of the NMC OSS (New Mexico and Colorado Spanish Survey).
The Southwest Studies program is known especially for its historical depth in New Mexican literature and folklore.

Materials and Technology:

- **Center for High Technology Materials**: Photonics; Microelectronics; Nanoscale Materials, Devices and their Applications: The mission of CHTM is to create and sustain a culture of excellence to promote research and education in photonics, microelectronics and nanoscale materials and devices and their applications, foster interaction between UNM, federal laboratories, industry and promote an entrepreneurial spirit for economic development with a regional focus but of global importance. CHTM is an international leader in the development of materials, devices, and systems for photonics, optoelectronics, microelectronics, nanoscience, nanotechnology and their application. Research areas include light matter interaction at extremely small length scales and ultrafast time intervals. Specific research topics include the epitaxial growth of compound semiconductor materials and devices, self-assembled quantum dots, quantum wells, nanowires, superlattices and lithographically-defined nanostructures, nanophotonics, doped and poled optical fibers, microring resonators and ultrafast optics, 2D materials and their structural, mechanical and electronic properties, application of 2D materials to flexible electronics, optoelectronics and photonics, rolled-up nanotech, bio-devices integration, materials for THz radiation, nano-scale magnetometry and MRI with nitrogen-vacancy centers in diamond, and nanoscale thermal energy conversion. Device studies include near infrared, detectors and sources for datacomm and telecomm, avalanche photodiodes, semiconductor lasers, longer wavelength infrared sources and detectors, photovoltaics, nanofluidics, GaN-based visible and UV sources, solid-state lighting and high-efficiency LEDs, visible edge-emitting and vertical-cavity surface-emitting lasers, applications of group III-nitrides to energy efficiency and renewable energy, and novel readout-circuit concepts for smart-pixel imagers. Systems related research includes advanced optical lithography, interferometric lithography, spectral sensing and imaging, molecular imaging with optically-pumped fluorophores, vibrometry using synthetic-aperture radar, ultrafast optical receivers, and microscopy. Emerging areas of research include, Anderson localization and wave propagation in random media, plasmonics, metamaterials and metasystems in the broader context of classical, quantum and computational imaging.

- **Center for High Technology Materials**: is committed to training the next generation of scientists, engineers, discoverers and entrepreneurs who can combine their technical training and critical thinking with excellent interpersonal and communication skills to become leaders of the 21st century. Our core strengths are: Research, creativity and innovation, interdisciplinary education, training and outreach, entrepreneurship and economic development. CHTM will continue to invent and discover disruptive technologies that can be scaled to
develop innovative advanced manufacturing initiatives to create self-sustaining wealth based economies to leave the earth a better place than we found it.

- **Institute of Meteoritics**: High pressure mineral physics. We have cutting edge laboratories featuring diamond anvil cell (DAC) and multi-anvil devices for simulate conditions in the Earth's interior. We also are the home institution for COMPRES.

- **Center for Quantum Information and Control (CQuIC)**: Full quantum control of the states and dynamics of the ground manifold of atomic cesium, for the purpose of quantum information processing. Fundamental theoretical analyses of the quantum limitations of the sensitivity of high-precision measurements. Seminal investigations of ground-state entanglement in many-body systems as a resource for quantum computation. Experimental investigations of techniques for robust discrimination of quantum states, for the purposes of reliable and efficient communication.

- **Center for High Technology Materials**: CHTM is an international leader in the development of materials, devices, and systems for photonics, optoelectronics, microelectronics, nanoscience, nanotechnology and their application. Research areas include light matter interaction at extremely small length scales and ultrafast time intervals.

- **Center for High Technology Materials**: CHTM is committed to training the next generation of scientists, engineers, discoverers and entrepreneurs who can combine their technical training and critical thinking with excellent interpersonal and communication skills to become leaders of the 21st century. Our core strengths are: Research, creativity and innovation, interdisciplinary education, training and outreach, entrepreneurship and economic development. CHTM will continue to invent and discover disruptive technologies that can be scaled to develop innovative advanced manufacturing initiatives to create self-sustaining wealth based economies to leave the earth a better place than we found it.

- **Center for High Technology Materials**: Specific research topics include the epitaxial growth of compound semiconductor materials and devices, self-assembled quantum dots, quantum wells, nanowires, superlattices and lithographically-defined nanostructures, nanophotonics, doped and poled optical fibers, microring resonators and ultrafast optics, 2D materials and their structural, mechanical and electronic properties, application of 2D materials to flexible electronics, optoelectronics and photonics, rolled-up nanotech, bio-devices integration, materials for THz radiation, nano-scale magnetometry and MRI with nitrogen-vacancy centers in diamond, and nanoscale thermal energy conversion. Device studies include near infrared, detectors and sources for datacomm and telecomm, avalanche photodiodes, semiconductor lasers, longer wavelength infrared sources and detectors, photovoltaics, nanofluidics, GaN-based visible and UV sources, solid-state lighting and high-efficiency LEDs, visible edge-emitting and vertical-cavity surface-emitting lasers, applications of group III-nitrides to energy efficiency and renewable energy, and novel readout-circuit
concepts for smart-pixel imagers. Systems related research includes advanced optical lithography, interferometric lithography, spectral sensing and imaging, molecular imaging with optically-pumped fluorophores, vibrometry using synthetic-aperture radar, ultrafast optical receivers, and microscopy. Emerging areas of research include, Anderson localization and wave propagation in random media, plasmonics, metamaterials and metasystems in the broader context of classical, quantum and computational imaging.

- **Center for Micro-Engineered Materials:** UNM Center for Micro-Engineered Materials is a materials research institute that specializes nano-materials research based on chemistry and chemical engineering synthetic approaches. Area of currently funded research endeavors are as follows (only areas totaling of $1M/year expenditures or higher are listed): 1. Novel Materials For Energy Conversion & Storage: nano-structured non-PGM catalysts for HOR/HER and ORR/ORR as well as non-carbon fuel synthesis and utilization (ammonia, hydrazine), self-regenerating PGM catalysts for low temperature oxidation and hydrogen generation. 2. Materials and catalysts for bio-driven feed-stock conversion, utilization and valuation. 3. Bio-electrochemical Systems and Bio-inspired Catalysts: microbial fuel cells, electrolyzers and water purification systems and adaptive catalysts cascades for deep oxidation of complex fuels. 4. Proto-cells: Mesoporous Materials for Drug Delivery and Therapeutics Advanced Additive Manufacturing: technology platform based on 3D printing of functional nano-materials with feature controls at meso-scale and scale-up to macro-scale films and devices.

- **COSMIAC:** Additive Manufacturing (AM) and Micro Dispensing (MD) - Working with NASA, UTEP and AFRL on 3D printing for space and high power RF applications.

- **Mechanical Engineering:** Faculty and students are increasingly engaged in interdisciplinary researches in energy, micro- and nanotechnology, and bio-engineering. Areas of distinction include integrative energy systems, multiscale mechanics of materials and fluids, and dynamic systems and control, as evidenced by recent publications in top-notch journals such as Nature Communications and Scientific Reports.

Water & Arid Environments:

- **Community and Regional Planning:** Food and water systems planning: CRP faculty blend the boundaries of basic and applied research and engaged scholarship in numerous projects that investigate the potential for systemic transformation in water use and reuse and local food systems

- **Community and Regional Planning:** Moises Gonzales is one of the foremost scholars on New Mexican cultural landscapes, following in the tradition of Jose Rivera (now emeritus) who conducted groundbreaking work on Acequia culture. **The Utton Center** is the only center in the State focused on water law.
We have developed distinctive expertise in environmental, agricultural and Native American water rights.

- **Center for Water and the Environment**: Water resources and watersheds, water quality and treatment; water and energy; water policy and society; Water utilities management, finance, and technologies?

- **Geography & Environmental Studies**: In addition, we have a very significant area of faculty expertise in research studying Socio-Ecological Systems and Resilience at a variety of scales -- from the national and regional to the watershed and community levels. We engage with faculty in a variety of other departments to undertake large, interdisciplinary projects in this area.

- **Museum of Southwestern Biology**: Comparative genomics of non-model organisms to include understanding the genomics of adaptation (to altitude, aridity, etc), genomic signatures of coevolution (e.g., host-parasite), and genomics of speciation, diversification and hybridization.

**Appendix A3: Evaluation of Research Criteria by Chairs and Directors**

Mean rating by all survey respondents (on a scale of 1: not important to 5: very important) of different criteria for research excellence.

<table>
<thead>
<tr>
<th>Research Products</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prestige</td>
<td>3.24</td>
</tr>
<tr>
<td>Funding $</td>
<td>3.35</td>
</tr>
<tr>
<td>Publication Numbers</td>
<td>3.72</td>
</tr>
<tr>
<td>Publication Quality</td>
<td>3.89</td>
</tr>
<tr>
<td>Number of Exhibitions</td>
<td>2.11</td>
</tr>
<tr>
<td>Quality of Exhibitions</td>
<td>2.28</td>
</tr>
<tr>
<td>Number of Patents</td>
<td>1.65</td>
</tr>
<tr>
<td>New initiatives</td>
<td>3.28</td>
</tr>
<tr>
<td>Novelty &amp; Creativity</td>
<td></td>
</tr>
<tr>
<td>Distinctiveness/innovation</td>
<td>4.02</td>
</tr>
<tr>
<td>Generates new approaches</td>
<td>3.91</td>
</tr>
<tr>
<td>Demonstrable research impact</td>
<td>3.87</td>
</tr>
<tr>
<td>Recognition</td>
<td></td>
</tr>
<tr>
<td>Invited Keynotes</td>
<td>3.73</td>
</tr>
<tr>
<td>Academic Awards</td>
<td>3.66</td>
</tr>
<tr>
<td>Memberships</td>
<td>3.16</td>
</tr>
<tr>
<td>Performance in Competitions</td>
<td>1.95</td>
</tr>
<tr>
<td>Student Involvement in Research</td>
<td></td>
</tr>
<tr>
<td>Number of students</td>
<td>3.75</td>
</tr>
<tr>
<td>Placement/recognition of students</td>
<td>3.57</td>
</tr>
<tr>
<td>New courses</td>
<td>2.77</td>
</tr>
<tr>
<td>Research visibility</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Score</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Media</td>
<td>3.26</td>
</tr>
<tr>
<td>High visibility collaborations</td>
<td>3.51</td>
</tr>
<tr>
<td>Impact on public policy</td>
<td>2.65</td>
</tr>
<tr>
<td>Community Engagement</td>
<td></td>
</tr>
<tr>
<td>Comm. Partners</td>
<td>3.14</td>
</tr>
<tr>
<td>Service learning</td>
<td>2.91</td>
</tr>
<tr>
<td>Outreach</td>
<td>3.41</td>
</tr>
<tr>
<td>Diversity</td>
<td></td>
</tr>
<tr>
<td># of underrepresented students/faculty</td>
<td>3.73</td>
</tr>
<tr>
<td># and diversity of undergrad research</td>
<td></td>
</tr>
<tr>
<td>Research on underrepresented topics</td>
<td>3.57</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td></td>
</tr>
<tr>
<td># publications in other disciplines</td>
<td>2.86</td>
</tr>
<tr>
<td>Appointments in multiple depts.</td>
<td>2.36</td>
</tr>
<tr>
<td>Collaborations across disciplines</td>
<td>3.32</td>
</tr>
</tbody>
</table>

Additional Research Criteria Listed by Department Chairs and Directors

- **Anthropology**: International collaborations that lead to new scientific questions; innovative new methodologies and theories that address those questions.
- **Anthropology**: Public outreach and public demonstrations, community development initiatives, consultation and collaboration with regional and international descendant and local communities or federal programs that include a focus on heritage research and public education.
- **Anthropology**: Research that illuminates the historically constructed character of social science categories and typologies, and critical inquiry into those constructions.
- **Art & Art History**: In the arts studio practice is the equivalent to scientific laboratory experiments and is the method through which many faculty produce their creative research. Others in our department are more traditional in academic humanities scholarship of archival research and publications. We work closely with our students and collaboration with them is an essential part of many artists' research programs.
- **Biology**: Quality of research as evaluated by the selectivity of the peer-reviewed journals where it is published.
- **Biology**: Research excellence in Biology can be found in groups of faculty with closely aligned interests and collaborations, and in the broad coverage of a field such as Biology through the leadership of highly motivated scholars. The pursuit of research excellence sometimes favors the former over the latter at the risk of concentrating resources to the exclusion of individual faculty labs that don't fit the model.
- **Center for Micro-Engineered Materials**: H-factor of the researcher; Citations (less self-citations); Impact factor of the journals where the work is being published.
- **Center for Micro-Engineered Materials**: Number PhD graduated from the program; their professional placement and success.
• **Center for Micro-Engineered Materials**: Visibility - natural and International is a must. There is only one criterion for science: 'the world criteria', true science cannot be local, regional or even national.

• **CETI - Center for Evolutionary and Theoretical Immunology**: an ability, with the help of appropriate mentoring, for CETI investigators to submit competitive research proposals that are well-received in the most competitive of funding agencies

• **CETI - Center for Evolutionary and Theoretical Immunology**: an ability to organize and develop a research program able to generate quality data resulting in publications in peer-reviewed journals of the highest quality

• **CETI - Center for Evolutionary and Theoretical Immunology**: Research receives remarkably little attention at UNM. Much, much more needs to be done to support the activities of PIs that work so hard to generate the proposals that support the entire enterprise. They are the real heroes at UNM because they are often the superb teachers as well. UNM has a long way to go to make their community of researchers feel better in their interactions with the administration. Imposition of inviolable deadlines regarding submission (often well before agency deadlines), abrupt treatments and decisions from administrators perceived to have little knowledge of and talent for research really rankle. Researchers are the ones with the exceptional talents that UNM must figure out how to absolutely cherish, and preemptively support including with salary increases, or we will lose them to more research-friendly environments.

• **CETI - Center for Evolutionary and Theoretical Immunology**: to engage in effective training of both graduate and undergraduate students and postdocs and to contribute to and be supportive of a vibrant research environment at UNM

• **Cinematic Arts**: Quality of publication NOT measured by impact factors, citation indices etc i.e. Is the work well-written, compelling, readable?

• **Communication and Journalism**: Co-authoring publications with doctoral students. Mentoring and involving graduate students and undergraduate students in research projects.

• **Community and Regional Planning**: Research project process or findings benefits community partners directly; Research project process or findings benefits community partners through building capacity for further organization growth or community change; Demonstrable impact that community partners made on research questions, findings or methods; The responses were not tied to the specific research areas but to the intersection between research and engaged scholarship.

• **COSMIAC**: How the research thrust fits within the climate of what is going on more broadly in the State of New Mexico

• **COSMIAC**: Reputation of the research in the eyes of peers at top institutions internationally

• **COSMIAC**: Total funding compared to other units in the School and University

• **CREATE (Center for Rapid Environmental Assessment and Terrain Evaluation)**: Novelty of work; Public good, Global scale
• **Earth Data Analysis Center:** Continue to bring in enough research dollars to remain self-sustaining.

• **Earth Data Analysis Center:** Continue to build a positive reputation as effective collaborators within our constituents.

• **Earth Data Analysis Center:** Continue to support our mission and that of the University, while providing unique research opportunities for our staff and students.

• **Earth Data Analysis Center:** EDAC’s most recent strategic planning efforts include expanded our research into engineering and use and operation of unmanned aerial vehicles, as a natural progression of a number of our current applied research initiatives.

• **Economics:** Quality of journal publications and citation impacts; impact on public policy; interdisciplinary collaborations; Research excellence is dependent upon enhancing and maintaining critical mass of faculty in centers of gravity or core strengths, such as environmental, resource and ecological economics. Research excellence is dependent upon keeping continuity and adequate staffing (with market pay rates) for research support at the department level. There are limits to the service center model when it comes to maintaining research strength in a unit.

• **EPSCoR/DataONE:** Research excellence at UNM seems to be recognized when it is good research focused on a narrow, disciplinary topic. I do not believe that large, transdisciplinary and interdisciplinary research projects are valued to the same extent that they are are at most major top-flight research universities.

• **EPSCoR/DataONE:** Sustainable energy development: promoting research collaborations in six areas--bioalgal, osmotic power, geothermal, Uranium, solar, and the nexus of social and natural sciences (i.e. modeling)

• **Center for Micro-Engineered Materials:** Number of type of companies started, supported and licensed technology to; licensing income

• **Museum of Southwestern Biology:** Long-term impact--at the end of one's career, what infrastructure have you developed that will endure and stimulate future research and teaching opportunities at UNM

• **Foreign Languages and Literatures:** Quality of research as measured by peer readers and evaluators

• **History:** Quality of University Press/Journal; Book Reviews

• **History:** The program’s reputation rests on its ability to consistently win nationally competitive grants from Fulbright, Fulbright-Hayes, the Andrew Mellon Foundation, and the National Endowment for the Humanities for its doctoral students and faculty

I am uneasy about the continued efforts to measure research productivity as the metrics often seem to be one-sidedly favoring stem disciplines. In our department, we also do research has may not have a new and unique quality but provides a public service in editing texts, translation, book reviewing for academic journals, writing encyclopedia entries, etc. All of these activities contribute to our discipline and its success, including the students’, but do not get measured by strict book or scholarly article metrics and thus fail to capture adequately what we do. Therefore, instead of trying to force every
discipline on campus into the same rubrics, compare apples to apples and not apples to oranges.

- **Language Literature and Sociocultural Studies**: Recognition/requests by communities and or community organizations for research assistance. Initiatives/programs that are a result of Community Engaged research. Include under Diversity in Research, research in international settings.

- **Linguistics**: Excellence Criteria: Proportion of department's doctoral students working on a research topic; Quantity & Quality of research products produced for community needs; Co-authorship of presentations and publications with students.

- **Manufacturing Engineering**: If the overarching purpose of a university is to create and transmit materials as parcels of education, then the definition of research should include the creation and transmission of materials that enhance a workforce pipeline that extends beyond a university.

- **Marketing, Information Systems, & Decision Sciences**: Recognized level of high quality publications based upon international journal lists as well as lists published by top universities in the discipline; Recognized level of high quality publications based upon international journal lists as well as lists published by top universities in the discipline; National Science Foundation Grants.

- **Maxwell Museum of Anthropology** is a non-academic unit; to the extent that staff teach or serve on committees, they do so through overlapping or adjunct appointments in academic departments. That causes us to have a low profile internally, since so much of UNM's introspection starts with the assumption that there are academic units and there are 'support' units. But we do original research! And we do involved students in that research!

- **Museum of Southwestern Biology**: Interdisciplinary catalyst

- **Museum of Southwestern Biology**: Success of under-represented students trained (not just how many)

- **Peace Studies**: Fantastic opportunities for locating funding sources for new and existing initiatives, as well as working with international technical agencies, collaborations.

- **Psychology Department**: Specialized lower impact journals are oftentimes viewed as acceptable in certain research areas.

- **Theatre and Dance**: Professorial and curricular practices reflecting NEA criteria for excellence; Cultural preservation and transmission at the highest level of professional involvement and artistic rigor.
Appendix A4: Research Active Units and their Chairs and Directors

Departments and Centers that responded to the survey with narrative data
Accounting
American Studies
Anthropology
Art and Art History
Biology
Center on Alcoholism, Substance Abuse and Addictions (CASAA)
Center for High Technology Materials (CHTM)
Center for Micro-Engineered Materials (CMEM)
Center for Quantum Information and Control (CQuIC)
Center for Water and the Environment
CETI - Center for Evolutionary and Theoretical Immunology
Cinematic Arts
College of Education Multicultural Education Center
Communication & Journalism
Community and Regional Planning
Computer Science
COSMIAC
CREATE (Center for Rapid Environmental Assessment and Terrain Evaluation)
Earth Data Analysis Center
Economics
English
EPSCoR/DataONE
Foreign Languages and Literatures
Geography & Environmental Studies
History
Honors College
Institute of Meteoritics
International Studies Institute
Landscape Architecture
Language Literacy and Sociocultural Studies
Latin American Programs in Education
Linguistics
Manufacturing Engineering Program
Marketing, Information Systems, & Decision Sciences
Maxwell Museum of Anthropology
Mechanical Engineering
Museum of Southwestern Biology
Music
Office of Contract Archeology
Peace Studies
Physics and Astronomy
Political Science
Psychology Department
List of Chairs and Center Directors invited to respond to the Survey

<table>
<thead>
<tr>
<th>College</th>
<th>Department</th>
<th>Name</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;S</td>
<td>American Studies</td>
<td>Alex Lubin</td>
<td><a href="mailto:alubin@unm.edu">alubin@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Anthropology</td>
<td>Les Field</td>
<td><a href="mailto:lesfield@unm.edu">lesfield@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Biology</td>
<td>Will Pockman</td>
<td><a href="mailto:pockman@unm.edu">pockman@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Chemistry &amp; Chemical Biology</td>
<td>Stephen Cabaniss</td>
<td><a href="mailto:cabaniss@unm.edu">cabaniss@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Chicana and Chicano Studies</td>
<td>Irene Vasquez</td>
<td><a href="mailto:ivasquez@unm.edu">ivasquez@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Communication and Journalism</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earth and Planetary Sciences</td>
<td>Peter Fawcett</td>
<td><a href="mailto:fawcett@unm.edu">fawcett@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Economics</td>
<td>Bob Berrens</td>
<td><a href="mailto:rberrens@unm.edu">rberrens@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>Anita Obermeier</td>
<td><a href="mailto:aobermei@unm.edu">aobermei@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Foreign Languages &amp; Literature</td>
<td>Pamela Cheek</td>
<td><a href="mailto:pcheek@unm.edu">pcheek@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Geography</td>
<td>Maria Lane</td>
<td><a href="mailto:mlane@unm.edu">mlane@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>History</td>
<td>Melissa Bokovoy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linguistics</td>
<td>Jill Morford</td>
<td><a href="mailto:morford@unm.edu">morford@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Mathematics and Statistics</td>
<td>Jens Lorenz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Philosophy</td>
<td>Mary Domski</td>
<td><a href="mailto:mdomski@unm.edu">mdomski@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Physics and Astronomy</td>
<td>Wolfgang Rudolph</td>
<td><a href="mailto:wrudolph@unm.edu">wrudolph@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Political Science</td>
<td>Timothy B. Krebs</td>
<td><a href="mailto:tkrebs@unm.edu">tkrebs@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Psychology</td>
<td>Jane Smith</td>
<td><a href="mailto:janelen@unm.edu">janelen@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Sociology</td>
<td>Sharon Erickson Neptsad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spanish and Portuguese</td>
<td>Anthony Cardenas</td>
<td><a href="mailto:ajcard@unm.edu">ajcard@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Speech and Hearing Sciences</td>
<td>Barbara Rodriguez</td>
<td><a href="mailto:brodrig@unm.edu">brodrig@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Center for Stable Isotopes.</td>
<td>Zachary Sharp</td>
<td><a href="mailto:zsharp@unm.edu">zsharp@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Center for Quantum Information and Control (CQuIC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carlton Caves</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Center for Rapid Environmental Assessment &amp; Terrain Evaluation (C.R.E.A.T.E)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Louis Scuderi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consortium of the Americas</td>
<td>Vasudev Kenkre</td>
<td><a href="mailto:kenkre@unm.edu">kenkre@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Earth Data Analysis Center</td>
<td>Shirley Baros</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feminist Research Institute</td>
<td>Elizabeth Hutchison</td>
<td><a href="mailto:ehutch@unm.edu">ehutch@unm.edu</a></td>
</tr>
</tbody>
</table>
Institute for Am, Indian Research  Jennifer Denetdale  jdenet@unm.edu
Institute for Social Research  Melissa Binder  mbinder@unm.edu
Institute of Meteoritics  Carl Agee  agee@unm.edu
Maxwell Museum  James Dixon  jdixon@unm.edu
Museum of Southwestern Biology  Joseph Cook  cookjose@unm.edu
Office of Contract Archeology  Robert Dello-Russo  rdellorusso@unm.edu
LAII; Political Science  Bill Stanley  wstanley@unm.edu
Africana Studies  Robert Jefferson, Jr.  jeffrob89@gmail.com
Ctr for Evolutionary and Theoretical Immunology  Eric Samuel Loker  esloker@unm.edu
Inst for Medieval Studies  Timothy Graham  tgraham@unm.edu
Int'l Studies Inst  Eleni Bastea  ebastea@unm.edu
Latin American Studies  Ronda Brulotte  brulotte@unm.edu
Master's of Public Policy  Melissa Binder  mbinder@unm.edu
Museum Studies  Loa Traxler  ljptraxler@unm.edu
Religious Studies  John Bussanich  john.bussanich@gmail.com
Sustainability Studies  Bruce T. Milne  bmilne@sevillete.unm.edu
Women Studies  Rajeshwari Vallury  rvallury@unm.edu
UNM Art Museum  Arif Khan  arifmkhan@unm.edu
Tamarin Institute  Diana Gaston  dgaston@unm.edu
Institute for the Study of Race and Social Justice  Nancy Lopez  nlopez@unm.edu
Peace Studies  J. E. Jamal Martin  drjamal@unm.edu
ASMQ
Accounting  Leslie Oakes  loakes@unm.edu
Finance International & technology Management  Sulieman Kassicieh  sul@unm.edu
Marketing Info & Decision Sciences  Steven Yourstone  yourstone@unm.edu
Organizational Studies  Michelle Arthur  arthurm@unm.edu
CFA
Art & Art History  Mary Tsiongas  tsiongas@unm.edu
Cinematic Arts  James Stone  jstone@unm.edu
Music  Eric Lau  elau@unm.edu
Theatre and Dance  Vladimir Conde Reche  vreche@unm.edu
COE
Educational Specialist  Ruth Luckasson  ruthl@unm.edu
Health Exercise & Sports Science  Todd Seidler  tseidler@unm.edu
Individual Family Comm Educ  Jay Parkes  parkes@unm.edu
LLSS  Rick Meyer  rmeyer@unm.edu
Teacher Ed, Ed Lead & Policy  Trenia Walker  tlwalker@unm.edu
Multicultural Education Center  Tryphenia Peele  tbpeele@unm.edu
Latin American Programs in Education (LAPE)  
Rebecca Blum-Martinez  rebeccab@unm.edu
Teacher Education, Educational Leadership & Policy  
Robin Minthorn  minthorn@unm.edu
Health, Exercise & Sports Sciences  Lorenda Belone  LJoe@salud.unm.edu

CULLS  
Senior Associate Dean  Frances Wilkinson  fwilkins@unm.edu
Director of Center for Southwest Research  
Michael Kelly  mtk@unm.edu
Associate Dean  Mark Emmons  emmons@unm.edu

LAW  
Associate Dean of Clinical Affairs  Aliza Organick  organial@unm.edu
Associate Dean for the Indian Law Program  
Christine Zuni Cruz  zunicruz@law.unm.edu
Director of the Legal Analysis & Communication Program  
Steven k. Homer  homer@law.unm.edu
Director of Madrid Law Inst  Nathalie Martin  martin@law.unm.edu
Utton Center  Adrian Oglesby  oglesby@unm.edu

SAAP  
Director of Architecture  John Quale  quale@unm.edu
Director of CRP  Renia Ehrenfeucht  rehrenfeucht@unm.edu
Director of Landscape Architecture  Alfred Simon  asimon@unm.edu
Design and Planning Assistance Center  
Michaele Pride  mlpride@unm.edu
UC- Liberal Arts and Indigenous Design and Planning Institute (iD+Pi)grative Studies  Theodore Jojola  tjojola@unm.edu

SOE  
Chemical & Biological Engineering  Abhaya Datye  datye@unm.edu
Civil Engineering  Mahmoud Taha  mrtaha@unm.edu
Computer Science  Darko Stefanovic  darko@cs.unm.edu
Mechanical Engineering  Chris Hall  cdhall@unm.edu
Nuclear Engineering  Anil Prinja  prinja@unm.edu
Center for Biomedical Engineering  Jeff Brinker  cjbrink@sandia.gov
Center for Emerging Energy Technology  Manel Martinez-Ramon  manel@unm.edu
Center for Water & the Environment  Kerry Howe  howe@unm.edu
COSMIAC  Christos Christodoulou  christos@unm.edu
<table>
<thead>
<tr>
<th>Department</th>
<th>Faculty Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inst for Space Nuclear Power ISNPS</td>
<td>Mohamed Shafik El-Genk</td>
<td><a href="mailto:mgenk@unm.edu">mgenk@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>Manufacturing Engineering</td>
<td>John Wood <a href="mailto:jw@unm.edu">jw@unm.edu</a></td>
</tr>
<tr>
<td></td>
<td>UNM Resilience Institute</td>
<td>Mahmoud Reda Taha <a href="mailto:mrtaha@unm.edu">mrtaha@unm.edu</a></td>
</tr>
<tr>
<td>UC/HC</td>
<td>Greg Cajete <a href="mailto:gcajete@unm.edu">gcajete@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leslie Donovan <a href="mailto:ldonovan@unm.edu">ldonovan@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>OVPR</td>
<td>Barbara McCrady <a href="mailto:bmccrady@unm.edu">bmccrady@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ricardo Maestas <a href="mailto:rmaestas5@unm.edu">rmaestas5@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>William Michener <a href="mailto:michene@unm.edu">michene@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meriah Heredia-Griego <a href="mailto:meriah@unm.edu">meriah@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>CASAA</td>
<td>Barbara Reyes <a href="mailto:breyes3@unm.edu">breyes3@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>IPEAR</td>
<td>Patrick Bridges <a href="mailto:bridges@unm.edu">bridges@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jeff Mitchel <a href="mailto:mitchell@unm.edu">mitchell@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>DataONE</td>
<td>Arash Mafi <a href="mailto:mafi@unm.edu">mafi@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>CEPR</td>
<td>Plamen Atanassov <a href="mailto:plamen@unm.edu">plamen@unm.edu</a></td>
<td></td>
</tr>
<tr>
<td>SHRI</td>
<td>CARC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BBER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHTM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CMEM</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Summary of Interviews

The summary below encapsulates interview responses in the larger framework of research excellence. Recommendations for strategic support and development are aggregated and included in the final section.

1. Breaking Barriers to new knowledge and understanding
   - Institute for Meteoritics is a national resource, with an impressive collection of meteorites and the Meteorite Museum. Researchers have instruments on the Mars rover
   - Materials Science: There are many decades of expertise even before CHTM including facilities and high profile individual research programs. UNM was ranked as having top Materials Science research even though there is no official materials science program. Our connection to the labs for this work is important
   - Housing: there is a long history of engagement in planning and design.
   - Accreditation team for Planning said they are the strongest community-based planning dept. in nation.
   - Landscape - one of strongest landscape design programs.
   - Arid lands - organizationally not fully developed, but several individual faculty have expertise. Topics such as acequias, water systems, design of cisterns and landscaping
   - Electromagnetics is excellent and has unique and impressive infrastructure. High powered microwaves to make plasmas
   - Business Ethics: Anderson seen as a leader in corporate social responsibility; put on the map by Jeanne Logsdon. Three Anderson faculty have served as division chair for Social Issues in Management Division of the Academy of Management (primary professional association).
   - Information Assurance: one of the Centers of Academic Excellence in Information Assurance designated by the NSA and Homeland Security.
   - The Mind Research Network is highly regarded nationally and internationally in brain imaging, neuroinformatics, and advanced analytics
   - Management of Technology: two distinguished professors work in this area. Related to national labs, helping startups (business plan competition).
   - UNM has a tremendous sense of place that unifies much of the research efforts in Arts and Sciences (A&S).
     o For example, the long ties to Physics and the National Labs have formed a basis for research in particle physics, optics, and quantum information.
     o The rich cultural heritage of New Mexico has shaped much of the research in Archeology, Cultural Anthropology, and Social Research in the College, and led to some of the best interdisciplinary work and centers (LAII comes to mind).
Through the Latin American and Iberian Institute (LAII), UNM has maintained a strong commitment to studying Latin American populations including the people of Mexico, Spanish and Creole-speaking parts of the Caribbean, Central and South America and Hispanic communities in the US. LAII has identified 99 faculty members who are actively engaged in Latin America or Iberia-focused research. These colleagues hold appointments in 9 different colleges. In the past 5 years collectively they have published 410 articles and book chapters and 41 scholarly books.

- Ecological research in arid land systems is a major focus, as is the geological history of the region including the greater Southwestern US and Central America.
- Research in COE relates to a number of broad areas linked to NM environment and communities such as STEM, Dual language education, bilingual education, Health, and other areas that reflect issues in diverse communities.
- Health Education field is an example of cross-cutting research especially with increasing emphasis on the impact of the environment on health; research that is being done in areas of genomics and brain research are examples.
  - Research in CASAA is excellent fundamental research and somewhat problem driven;
  - CHTM/CMEM energy and materials and photonic materials, with a heavy-duty application bent.
  - Fundamental research in biology (CETI). Many units and people involved in cross-cutting research, and application-based research.

2. Breaking Barriers between communities and the academy in community-engaged research
   • Community-engaged research at UNM is distinctive by the nature of our community. We are a metropolitan area in a rural, high-poverty state.
   • Fine Arts, Architecture and Planning and Education colleges have well-defined community-engaged research missions that they encourage and evaluate systematically.
   • Digital fabrication and visualization. There is a fabrication lab (service center) with equipment that no one else in state has. It is strong for education purposes, community-engaged work like building playhouses, little free libraries, and museum displays.
   • Institute for Medieval Studies (Tim Graham) holds symposia and lectures that are packed with community attendance
   • Critical Accounting: strong group that publishes in Accounting, Organizations and Society, including the editor of the journal. This area meshes with social responsibility
- Participatory approach is being used in research related to preparation of teachers such as the COE Transformative Action Groups; this COE project is a cross disciplinary initiative to transform teacher preparation involving faculty across different departments within COE; project has a thorough evaluation framework built into this Kellogg funded research project.
- COE Re-imagining TAG group is one example because it includes an evaluation framework for assessing the impact of the project on teacher preparation as well as the schools and communities where the project is situated. It also includes a component of self-reflection for faculty participating in this project.
- The Latin American and Iberian Institute (LAII) is currently focusing research on criminal and police violence in Latin America in the areas of Sociology, Political Science, Anthropology, History, Community and Regional Planning and Art and Art History.

3. Breaking Barriers to underrepresented populations and topics to promote diversity in academic research
   - Community-engaged research is more prevalent in NM than many other places.
   - We have many first-generation higher-education students.
   - Many students arrive at UNM with prior service-learning experiences.
   - The University has a large and diverse student population, appropriate for a Carnegie-designated "High Hispanic-serving" institution and a Research Level-One Institution. This student population acts as a catalyst for faculty to undertake distinctive research.
   - We provide a flagship education to a non-traditional undergrad population, and we have excellent research in areas of interest to the communities we serve: Hispano / Latino (in NM), Latin America, Native-American and by extension, indigenous communities in other parts of the world.
   - We study diverse communities and under-represented groups
   - race / ethnicity as a component of other things, e.g. criminology
   - The Chaco Canyon research including the Hibben collection & National Park Service archives
   - Land Arts of the American West (supported by the Lannan and Mellon Foundations) enters into meaningful collaborations with communities within New Mexico and across the Southwest.
   - The Latin American and Iberian Institute (LAII) sponsors conferences across a range of themes including workshops on asylum for migrants fleeing violence, authority and identity in Colonial Ibero-America, Africans and their descendants in Early Modern Latin America and a symposium on mutual influences of US and Latin American filmmakers.

4. Breaking Barriers in expression by fostering creativity, performance and novelty
• The College of Fine Arts (CFA) has fostered creativity in the visual and performing arts through a nationally and internationally recognized faculty across the fields of Music, Art and Art History, Cinematic Arts and Theater and Dance. The Tamarind Institute is recognized as the premier printmaking institution in the world. CFA’s Arts Learning Laboratory is dedicated to innovative arts education practices evidenced through Land Arts of the American West, Arts-in-Medicine and Dancing Legacy Partnership with Brown University. The Interdisciplinary Film and Digital Media program in Cinematic Arts serves as a center for ground-breaking collaborations and training for UNM students. The Creative Leadership Initiative, newly redesigned through a McCune Foundation grant prepares future artists and arts administrators to become active participants in their larger communities.

• Highlight our museums (Meteorite, Hibben Collection, SW biology)

• Extensive creative interdisciplinary work is already ongoing (e.g. work on mars program, work at the various centers (MRN, CASAA, CHTM, etc) and should be expanded

5. Creating Connections through interdisciplinary research efforts organized around problems or themes that transcend traditional disciplinary categories

• In the College of Education (COE) a cross-disciplinary project entitled Transformative Action Groups works to transform teacher preparation involving faculty across different departments within COE.

• The Social Determinants of Health Collaborative with the Health Sciences Center focuses on the impacts of health issues.

• The NEA research program director added the importance of working in an interdisciplinary way to advance knowledge in both fields, highlighting the value and impact the arts have on ideas and communities as well as the impact that other domains have on the arts. His/her example was recent NEA-funded project at UNM, a collaboration between CFA Music and North Campus that resulted in the article: “Musical Creativity Revealed in Brain Structure: Interplay between Motor, Default Mode and Limbic Networks”, *Nature-Scientific Reports* 6 (2016)

• Collaborations with the Health Sciences Center, particularly Cancer Research Center and other basic cancer research "Indigenous design” – one of the first such programs in the world.

• No other university has connections with the national labs…Sandia (largest number of phd's from UNM), same for Los Alamos (#2 is Univ of Illinois)...grown some areas in cyber..AFRL, Sandia, Los Alamos (research & high energy density physics)...not for large companies, but Fed Gov is spending 5-10 billion, most in new mexico….

• Center for Stable Isotopes created 3 years ago by bringing together EPS and Biology faculty who needed same tools for similar work.
We can take simple steps that encourage understanding between units: example a PIVOT training that helps faculty in one unit understand how the rest of the university will view you: update profile.

Get faculty out of the department/college to communicate with faculty in other departments/colleges. What can we be doing to get more engaged across campus.

Creating a more effective infrastructure for shared resources. Also an opportunity to create research collaborations.

Big vision…should be focusing on problems vs solutions (technologies)...poverty, energy, healthcare, environment (green energy/smart grid), can attack one big problem from multiple areas....(e.g. water, have river w/ state/international issues....weather problems....technologies...center for water/energy/policy...alpha centura beaming...

There should be more seed funding that encourages main campus and north campus to collaborate.

Get companies to buy in to join consortium...not a lot of companies....maybe do something IP free...we do very well in terms of research funding/faculty (about 1000 faculty, about 250 funded at very high rate...)...about $100,000 each...or almost $400K across the 250....higher 10 people (1-2 will be getting numbers of the others)...

Team up...boeing, raytheon, going for $250 million proposals....how to team up with these large proposals...craig kief teamed up with wiley (gets $1M/year for just hiring 4 people and give them appointments...)....hispanic opportunities...vehicle for large contracts....

External centers (like The Mind Research Network) are great resources for collaborative work.

Areas of Excellent Cross cutting research: Energy, Water, Information, Global systems, Biodiversity, Latin American Studies, Race and Ethnicity, History and Culture, Human-Biological-Geological Coupled systems with special emphasis on arid lands.

D2K symposium that focused on linking research strengths through big data analysis and synthesis. http://news.unm.edu/news/researchers-discuss-opportunities-and-collaborations-at-data-to-knowledge-symposium

The Women, Work, Water initiative was funded by the National Science Foundation (NSF) and explored the role of the humanities in scientific research, introducing narrative and visual arts to the sciences while introducing data concepts to humanities faculty and students.

6. Creating Connections between research and education by engaging students in research or incorporating research into the classroom and educational activities.

The College of Fine Arts’ Arts Learning Laboratory has promoted a ground-breaking pedagogy for the arts and creative leadership for nearly a decade.
• The STEM collaborative program has created pipelines for students to enter into STEM study at UNM
• Biggest problem is education system (K-12) is not preparing people for university

Big Questions:
1. Energy
• CHTM/CMEM centers do research in energy and materials and photonic materials with potentially important applications.
• Los Alamos (research & high energy density physics)
• Link work between climate and ecological research to clean energy

2. Water/Environment
• UNM research in areas that intersect ecology, climatology and high-performance computing. UNM can help the national labs improve climate models through use of novel devices and energy studies.
• Link research in water problems and remediation to ecosystems research
• Sustainability Studies, including cross-disciplinary food inquiry
• Many Art and Ecology programs including Land Arts of the American West tie into regional water-use research.
• Institute for Meteoritics is a national resource, with an impressive collection of meteorites and the Meteorite Museum. Researchers have instruments on the Mars rover (lots of implications, e.g. policies, longevity, prosthetics, music, etc)
• AFRL on weather, space sciences (specific to engineering)...future of humanity
• Green energy/smart grid
• The Latin American and Iberian Institute (LAII) has emerging areas of research related to food production and trade in Latin America combining international markets, cultural meanings of foods and how these are effected by international forces. The LAII is also focusing research on the stresses produced by climate change in Latin American Societies related to water supply, flooding and reduced or altered agricultural productivity.

3. Social and cultural issues (Health and Addiction)
• Research in CASAA on substance use/addiction.
• The Arts-in-Medicine program is a model for palliative care, veteran care, and AIDS, drug and chronic illness arts intervention and has been for more than a decade. Program reach is across New Mexico and internationally in Africa.
• Collaborations with the Health Sciences Center, particularly Cancer Research Center and other basic cancer research "Indigenous design" – one of the first such programs in the world.
• The Mind Research Network does extensive brain imaging and genetics work across a wide variety of areas (mental illness, substance use, ADHD, normative development, brain injury, cognitive impairment, etc.)
• Business Ethics: Anderson seen as a leader in corporate social responsibility; put on the map by Jeanne Logsdon. Three Anderson faculty have served as division chair for Social Issues in Management Division of the Academy of Management (primary professional association).
• The Social Determinants of Health Collaborative with the Health Sciences Center focuses on the impacts of health issues.

4. Place-based research in NM
• College of Education is undertaking research in a number of broad areas linked to the NM environment, including bilingual education, health and others that reflect issues in indigenous and other NM communities.
• Areas of local research include: southwestern archeology, the New Mexico Historical Review, UNM Press volumes on the Southwest, Hispanic Historical Review, Journal of Anthropological Research and the Historic Preservation and Regionalism Program in the School of Architecture, as well as Land Arts of the American West, Indigenous and Latin American Arts, Flamenco Studies, etc.
• Landscape - one of strongest landscape design programs
• Economic development
  o UNM Small Business Institute has received press for its impact on the economy
Appendix C: Analysis of Quantitative Data for Research Excellence Working Group

We obtained quantitative data of various kinds to provide objective information about the strength of the research enterprise in different schools and colleges. While size alone does not speak to the quality of the research in different units, programs and departments with thriving research are likely to attract graduate students, who will themselves produce more research. The correlation between research funding and activity varies across domains, with STEM fields likely to obtain larger amounts of external funding than are programs in arts, humanities, and education. Despite these caveats, numerical data can provide some insight as to which areas of activity are more active at UNM.

I. Numbers of faculty in departments
Data on the numbers of main campus faculty as of September 27, 2016, were provided by Faculty Contracts. The first issue in using these data is defining “research-active” faculty.

For purposes of this analysis, all tenured and tenure-track faculty were included (Asst. Prof., Assoc. Prof., Prof., Distinguished Prof.). All faculty holding a title that included the word “Research” were included, including those identified as “Research Lecturer” or “Research Scholar”. All other titles including the word “Lecturer” were excluded. Professors of Practice were excluded.

Besides the Colleges and Schools that might be the most obvious affiliations, faculty are also affiliated with the University Libraries (27, plus 7 in the OILS program), and with the OVPR and four research centers that report to the OVPR. These all have relatively small numbers of faculty assigned to them (the largest is CHTM at 7 faculty).

*Table C 1: Number of tenured, tenure-track, and research faculty in the 20 main campus departments with the most faculty*

<table>
<thead>
<tr>
<th>Total faculty in dept</th>
<th>Research faculty</th>
<th>Tenured &amp; Tenure-track</th>
<th>name of dept</th>
<th>name of College/School</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>13</td>
<td>38</td>
<td>Biology</td>
<td>College of Arts Sciences A S</td>
</tr>
<tr>
<td>49</td>
<td>19</td>
<td>30</td>
<td>Electrical Computer Engineering</td>
<td>School of Engineering</td>
</tr>
<tr>
<td>39</td>
<td>1</td>
<td>38</td>
<td>Art Art History</td>
<td>College of Fine Arts CFA</td>
</tr>
<tr>
<td>37</td>
<td>9</td>
<td>28</td>
<td>Physics Astronomy Department</td>
<td>College of Arts Sciences A S</td>
</tr>
<tr>
<td>34</td>
<td>6</td>
<td>28</td>
<td>Psychology Department</td>
<td>College of Arts Sciences A S</td>
</tr>
<tr>
<td>33</td>
<td>0</td>
<td>33</td>
<td>Music</td>
<td>College of Fine Arts CFA</td>
</tr>
</tbody>
</table>
Ten of the 20 largest departments by faculty count are in the College of Arts & Sciences. Following is a listing of all units that are the primary affiliation for one or more faculty.

*Table C 2: Number of tenured, tenure-track, and research faculty as of September 2016.*

<table>
<thead>
<tr>
<th>College</th>
<th>Department or Program</th>
<th>number of faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>University College</td>
<td>Native American Studies</td>
<td>4</td>
</tr>
<tr>
<td>Honors College</td>
<td>Honors College</td>
<td>11</td>
</tr>
<tr>
<td>School of Public Administration</td>
<td>School of Public Administration</td>
<td>12</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Art Art History</td>
<td>39</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Cinematic Arts</td>
<td>5</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Music</td>
<td>33</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Theatre and Dance</td>
<td>13</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>African American Studies</td>
<td>3</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>American Studies</td>
<td>11</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Department</td>
<td>Seats</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Anthropology</td>
<td>26</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Biology</td>
<td>51</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Chemistry</td>
<td>22</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Chicano Studies Program</td>
<td>1</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Communication Journalism</td>
<td>15</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Earth and Planetary Sciences</td>
<td>18</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Economics</td>
<td>17</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>English</td>
<td>33</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Foreign Languages Literatures</td>
<td>13</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Geography</td>
<td>9</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>History</td>
<td>28</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Linguistics</td>
<td>11</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Mathematics Statistics</td>
<td>30</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Museum Studies</td>
<td>1</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Philosophy</td>
<td>13</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Physics Astronomy</td>
<td>37</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Political Science</td>
<td>17</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Psychology</td>
<td>34</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Religious Studies Prgm</td>
<td>0</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Sociology</td>
<td>18</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Spanish Portuguese</td>
<td>14</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Speech and Hearing Sciences</td>
<td>7</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Womens Studies</td>
<td>0</td>
</tr>
<tr>
<td>Department/Program</td>
<td>Course Title</td>
<td>Code</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Anderson Sch of Management</td>
<td>Accounting</td>
<td>10</td>
</tr>
<tr>
<td>Anderson Sch of Management</td>
<td>Finance Intl Tech Mngt</td>
<td>14</td>
</tr>
<tr>
<td>Anderson Sch of Management</td>
<td>Mrkting Info Decision Sci</td>
<td>11</td>
</tr>
<tr>
<td>Anderson Sch of Management</td>
<td>Organizational Studies</td>
<td>13</td>
</tr>
<tr>
<td>College of Education</td>
<td>Educational Specialties Ed Spec</td>
<td>14</td>
</tr>
<tr>
<td>College of Education</td>
<td>Health Exercise &amp; Sports Science</td>
<td>19</td>
</tr>
<tr>
<td>College of Education</td>
<td>Individual Family Comm Educ</td>
<td>24</td>
</tr>
<tr>
<td>College of Education</td>
<td>Language Literacy Sociocultural</td>
<td>17</td>
</tr>
<tr>
<td>College of Education</td>
<td>Teacher Ed, Ed Lead &amp; Policy</td>
<td>30</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Ctr for Biomedical Engineering</td>
<td>1</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Ctr for Emerging Energy Technology</td>
<td>1</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Chemical and Biological Engr</td>
<td>18</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Chemical Nuclear Engineering</td>
<td>6</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Civil Engineering Civil Engr</td>
<td>17</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Computer Science</td>
<td>17</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Electrical Computer Engineering</td>
<td>49</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Mechanical Engineering</td>
<td>15</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Nuclear Engineering</td>
<td>14</td>
</tr>
<tr>
<td>School of Law</td>
<td>Law Library &amp; Information Tech</td>
<td>3</td>
</tr>
<tr>
<td>School of Law</td>
<td>School of Law</td>
<td>31</td>
</tr>
<tr>
<td>School of Law</td>
<td>SOL Utton Center</td>
<td>1</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Architecture Program</td>
<td>16</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Commt Regional Planning Prg</td>
<td>9</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Landscape Architecture Program</td>
<td>4</td>
</tr>
<tr>
<td>University Libraries</td>
<td>Organization Info Learning Science</td>
<td>7</td>
</tr>
<tr>
<td>University Libraries</td>
<td>University Libraries</td>
<td>27</td>
</tr>
</tbody>
</table>
II. Numbers of graduate students in programs
Data: The Graduate School provided the numbers of graduate students in the various graduate programs for the fall semester 2014, fall 2015 and fall 2016. These were averaged to create the data set used for the analyses reported here. Programs based in Health Sciences were excluded from these analyses.

Table C 3: Average (fall semesters 2014-2016) count of graduate students in graduate programs, 15 largest.

<table>
<thead>
<tr>
<th>College</th>
<th>Department</th>
<th>Avg. number grad students</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Education COE</td>
<td>Dept Teacher Ed, Ed Lead &amp; Policy</td>
<td>285</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Electrical Computer Engineering</td>
<td>232</td>
</tr>
<tr>
<td>College of Education COE</td>
<td>Language Literacy Sociocultural LL</td>
<td>207</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Computer Science</td>
<td>181</td>
</tr>
<tr>
<td>College of Education COE</td>
<td>Individual Family Comm Educ IFCE</td>
<td>172</td>
</tr>
<tr>
<td>School of Public Administration</td>
<td>School of Public Administration</td>
<td>154</td>
</tr>
<tr>
<td>College of Education COE</td>
<td>Health Exercise &amp; Sports Science</td>
<td>154</td>
</tr>
<tr>
<td>College of Education COE</td>
<td>Educational Specialties Ed Spec</td>
<td>148</td>
</tr>
<tr>
<td>College of Arts Sciences AS</td>
<td>Anthropology Department</td>
<td>114</td>
</tr>
<tr>
<td>College of Fine Arts CFA</td>
<td>Art Art History</td>
<td>107</td>
</tr>
<tr>
<td>College of Arts Sciences AS</td>
<td>AS Biology General Administrative</td>
<td>107</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Mechanical Engineering</td>
<td>106</td>
</tr>
</tbody>
</table>
Note that these data include graduate students at all levels (master's, doctoral, and certificate programs), some of which do not include a substantial research component. Measures of the number of PhD dissertations produced may provide a better gauge of the extent of the graduate student research enterprise in different units. (See section III.B. below.)

Following is a list of the numbers of graduate students in all Main Campus departments and graduate programs. (Note that the numbers for many departments include students enrolled in various programs. Programs listed separately below are those that are across more than one department or college.)

*Table C 4: Average number of graduate students enrolled in departments or interdisciplinary programs, calculated over fall 2014, fall 2015, and fall 2016 semesters.*

<table>
<thead>
<tr>
<th>College</th>
<th>Department or Program</th>
<th>Avg. number grad students</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Public Administration</td>
<td>School of Public Administration</td>
<td>154</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Art Art History</td>
<td>107</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Music</td>
<td>86</td>
</tr>
<tr>
<td>College of Fine Arts</td>
<td>Theatre and Dance</td>
<td>14</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>American Studies</td>
<td>52</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Anthropology</td>
<td>114</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Biology</td>
<td>107</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Chemistry</td>
<td>58</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Latin American Studies</td>
<td>21</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Communication Journalism</td>
<td>51</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Earth and Planetary Sciences</td>
<td>51</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Economics</td>
<td>49</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>English</td>
<td>92</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Foreign Languages Literatures</td>
<td>32</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Geography</td>
<td>22</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>History</td>
<td>68</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Linguistics</td>
<td>62</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Mathematics Statistics</td>
<td>85</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Philosophy</td>
<td>32</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Physics Astronomy</td>
<td>74</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Political Science</td>
<td>34</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Psychology</td>
<td>76</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Sociology</td>
<td>36</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Spanish Portuguese</td>
<td>54</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences</td>
<td>Speech and Hearing Sciences</td>
<td>57</td>
</tr>
<tr>
<td>College of Education</td>
<td>Teacher Ed, Ed Lead &amp; Policy</td>
<td>285</td>
</tr>
<tr>
<td>College of Education</td>
<td>Educational Specialties Ed Spec</td>
<td>148</td>
</tr>
<tr>
<td>College of Education</td>
<td>Health Exercise &amp; Sports Science</td>
<td>154</td>
</tr>
<tr>
<td>College of Education</td>
<td>Individual Family Comm Educ</td>
<td>172</td>
</tr>
<tr>
<td>College of Education</td>
<td>Language Literacy Sociocultural</td>
<td>207</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Chemical and Biological Engr</td>
<td>23</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Civil Engineering</td>
<td>99</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Computer Science</td>
<td>181</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Electrical Computer Engineering</td>
<td>232</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Mechanical Engineering</td>
<td>106</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Nuclear Engineering</td>
<td>47</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Biomedical Engineering</td>
<td>23</td>
</tr>
<tr>
<td>School of Engineering</td>
<td>Nanoscience &amp; Microsystems</td>
<td>56</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Architecture Program</td>
<td>73</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Commy Regional Planning Prg</td>
<td>73</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Landscape Architecture Program</td>
<td>28</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Historic Preservation &amp; Region</td>
<td>9</td>
</tr>
<tr>
<td>School of Architecture Planning</td>
<td>Urban and Regional Design</td>
<td>1</td>
</tr>
<tr>
<td>University Libraries</td>
<td>Organization Info Learning Science</td>
<td>104</td>
</tr>
<tr>
<td>College of Arts &amp; Sciences and School of Engineering</td>
<td>Optical Science &amp; Engineering</td>
<td>59</td>
</tr>
<tr>
<td>Graduate Studies</td>
<td>Water Resources</td>
<td>39</td>
</tr>
</tbody>
</table>

III. Relating numbers of faculty in departments to size of graduate programs

A. Numbers of faculty and numbers of graduate students

Issues: There are numerous issues in attempting to relate the data on faculty numbers and the data on graduate student numbers.
• While some departments offer a single graduate program (or at least, one that appears under a single name in the data), many offer multiple programs. This seems to be particularly true in the College of Education. This means that the number of graduate students served by these departments must be calculated by summing the numbers from the various programs. A simple example is the Department of Spanish & Portuguese, whose programs are listed as “Spanish”, “Portuguese”, and “Spanish and Portuguese”.
• Some graduate programs are affiliated with more than one department or college. Examples include “Nanoscience and Microsystems Engineering”. Thus it is not possible to relate the numbers of students in these programs to the number of faculty in any particular department.
• Some programs are affiliated with multiple departments across two or more colleges. This is true, for example, of “Optical Science and Engineering”, “Latin American Studies”, and “Educational Linguistics”. This creates the same issue as above.
• The Water Resources Program is housed in Graduate Studies, not in an academic department.

Data massaging: The following choices were made in working with these data for the analysis in this section. These choices were made purely to simplify the analysis; they are not intended to express any judgment.
• The following programs were excluded because their faculty belong to multiple departments, or in some cases multiple colleges / schools: "Latin American Studies", “Biomedical Engineering”, “Nanoscience and Microsystems”, “Nanoscience and Microsystems Engineering”, "Optical Science and Engineering", "Water Resources", “Historic Preservation and Regionalism”, and "Urban and Regional Design".
• “Educational Linguistics” was included in Language, Literacy, and Sociocultural Studies, because that is its administrative home, although the program also includes faculty in other departments in the College of Education and the College of Arts & Sciences.

• Six faculty members are listed as "Chemical Nuclear Engineering". They were excluded from the analysis as it was not apparent how to associate them with a specific graduate program.

Other programs were assigned to the departments that house them, and the numbers of students totaled for each department.

The following units have faculty assigned to them, but there was no data on graduate students for them:
Anderson Schools of Management, School of Law, Honors College, University College, and the research centers under the OVPR.

Figure C 1: Graph comparing total number of graduate students in programs affiliated with a department, to number of research-active faculty in that department.

B. Numbers of faculty and numbers of theses and dissertations
An additional analysis was done of the numbers of Masters theses and PhD dissertations produced in different Main Campus graduate programs. This analysis is based on data provided by the library of theses and dissertations stored in LoboVault. The data set consists of all those submitted from January 2009 – August 2016. Note that some departments did not confer doctoral degrees during this time period. The ten programs with the largest number of PhD dissertations during this period are shown in the table below.
Electrical and Computer Engineering 120
Psychology 79
Anthropology 70
Biology 69
Physics & Astronomy 68
Communication and Journalism 54
English 53
Language, Literacy, and Sociocultural Studies 53
Computer Science 51
History 51

The ten programs with the largest number of Masters theses are shown in the table below. Note that in many programs, few or no Masters students write theses; rather, they complete a comprehensive exam or a capstone project.

<table>
<thead>
<tr>
<th>Program</th>
<th>Number of Masters theses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td>93</td>
</tr>
<tr>
<td>Psychology</td>
<td>70</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>62</td>
</tr>
<tr>
<td>Earth and Planetary Sciences</td>
<td>56</td>
</tr>
<tr>
<td>Biology</td>
<td>48</td>
</tr>
<tr>
<td>Foreign Languages and Literatures</td>
<td>38</td>
</tr>
<tr>
<td>School of Architecture and Planning (all)</td>
<td>38</td>
</tr>
<tr>
<td>History</td>
<td>36</td>
</tr>
<tr>
<td>Communication and Journalism</td>
<td>35</td>
</tr>
<tr>
<td>English</td>
<td>32</td>
</tr>
<tr>
<td>Mathematics &amp; Statistics</td>
<td>32</td>
</tr>
</tbody>
</table>

A further analysis was done to relate the numbers of theses and dissertations (combined) to the number of faculty in departments. Graduate programs in Biomedical Engineering, Latin American Studies, Nanoscience and Microsystems, and Optical Science and Engineering were excluded from this analysis because they are highly interdisciplinary and cannot be meaningfully associated with any single department. For departments whose faculty contribute to these programs, this will have the effect of appearing to reduce the number of theses and dissertations.
IV. Dissertation abstracts
The library [thanks to Karl Benedict and Kevin Comerford] provided the texts of the abstracts from all dissertations submitted during the period 2009-2016. These were analyzed to identify the most frequently occurring terms, which should relate to subject areas that are frequently chosen as the topic of dissertations. Note that dissertations in Health Sciences programs are included in these analyses and displays.

Words that were not likely to be informative were excluded from the analysis: this includes both very common words (“the”, “and”, etc.) and also words that commonly occur in academic writing. After these exclusions, the most common 1-, 2-, 3- and 4-grams were determined. Displays (“Wordles”, http://www.wordle.net/) of the 2- and 3-grams are provided here. These displays show the most frequent terms in larger print.

Further exclusions were made to generate these plots.
2-grams: The basic data set consisted of all 2-grams with frequency greater than 10. Several 2-grams consisting of numbers were deleted from the list. Also excluded were 2-grams including the word “dissertation” preceded or followed by a word like “examines” or “presents”, as these were deemed uninformative.

The 2-gram “United States” was by far the most frequent in the data set, occurring 254 times. (The next most frequent was “Rio Grande”, occurring 101 times.) “United States” was excluded from the display because in order to accommodate such a frequent phrase, the plotting program makes all the other words too small to read.

The resulting display of 2-grams:
3-grams: All 3-grams with frequency of five or greater were collected. The display below excludes the most frequent, “southwestern United States” (occurring 41 times), for the same reason that “United States” was excluded from the 2-grams. The second most frequent 3-gram was “sp n. a.”, occurring 38 times. This was also excluded from the display. The most frequent 3-gram included in the display is “magnetic resonance imaging”, which occurred 23 times.

3-grams:
V. Research awards

Data on research awards for FY16 was provided by Contract and Grant Accounting. In the analyses reported here, only the 842 awards with a positive amount of funding were included. (The original data included 286 no-cost extensions, non-disclosure agreements, and other “awards” that do not represent new funding amounts, and 30 awards listed as having negative amounts.) Awards to branch campuses and their units (e.g., the Harwood) were excluded.

These data are categorized by the administrative unit that manages each award. Funding was awarded to 83 different units.

Units with the largest monetary amounts awarded were:

<table>
<thead>
<tr>
<th>unit</th>
<th>total amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVPR EPSCOR</td>
<td>12,703,385.00</td>
</tr>
<tr>
<td>Biology Department</td>
<td>12,661,897.10</td>
</tr>
<tr>
<td>CE-Externally Funded Programs</td>
<td>10,092,606.00</td>
</tr>
<tr>
<td>Electrical Computer Engineering</td>
<td>9,062,923.82</td>
</tr>
<tr>
<td>Computer Science</td>
<td>6,710,620.00</td>
</tr>
<tr>
<td>CASAA</td>
<td>6,284,017.00</td>
</tr>
<tr>
<td>Meteoritics</td>
<td>5,925,427.00</td>
</tr>
<tr>
<td>Center for High Tech Materials CHTM</td>
<td>5,803,311.00</td>
</tr>
<tr>
<td>Ctr for Micro Engineering Materials</td>
<td>4,262,010.00</td>
</tr>
<tr>
<td>Physics Astronomy Department</td>
<td>3,608,061.00</td>
</tr>
</tbody>
</table>
Units with the largest number of awards: (Although one PI may have numerous awards, a larger number of awards tends to indicate a larger number of different individuals receiving research funding.)

<table>
<thead>
<tr>
<th>unit</th>
<th>count of grants funded FY16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology Department</td>
<td>99</td>
</tr>
<tr>
<td>Electrical Computer Engineering</td>
<td>49</td>
</tr>
<tr>
<td>Physics Astronomy Department</td>
<td>39</td>
</tr>
<tr>
<td>CASAA</td>
<td>38</td>
</tr>
<tr>
<td>Center for High Tech Materials CHTM</td>
<td>37</td>
</tr>
<tr>
<td>Ctr for Micro Engineering Materials</td>
<td>31</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>27</td>
</tr>
<tr>
<td>COSMIAC</td>
<td>26</td>
</tr>
<tr>
<td>Maxwell Museum Department</td>
<td>24</td>
</tr>
<tr>
<td>Computer Science</td>
<td>22</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td>22</td>
</tr>
<tr>
<td>Center for Water &amp; the Environment</td>
<td>21</td>
</tr>
<tr>
<td>Chemistry Department</td>
<td>19</td>
</tr>
<tr>
<td>Earth and Planetary Sciences Dept</td>
<td>19</td>
</tr>
<tr>
<td>KNME Operations</td>
<td>18</td>
</tr>
<tr>
<td>Ctr for Education Policy Research</td>
<td>17</td>
</tr>
<tr>
<td>CE-Externally Funded Programs</td>
<td>15</td>
</tr>
<tr>
<td>Inst for Policy, Eval &amp; Applied Res</td>
<td>15</td>
</tr>
<tr>
<td>Psychology Department</td>
<td>14</td>
</tr>
<tr>
<td>Sociology Department</td>
<td>14</td>
</tr>
</tbody>
</table>
Appendix D: Summary of prior reports
Summaries of A&S hiring plans, ADR 2015 surveys, the Community Engaged Research plan, and the Provosts 2013 Interdisciplinary Report are available here: https://docs.google.com/spreadsheets/d/1DASyUzBM3YoTLyfrV2g4Gym09u5FLEj0mGG1yxf1Nw7k/edit?usp=sharing

Appendix E: Recommendations from interviews, surveys and prior reports

Recommendations 1. From Interviews
1. Support excellent research & improve the research process
   - Capture what faculty do in systematic way
   - Find ways to identify and communicate excellence “that is so ubiquitous and obvious that it’s almost like seeing air”
   - Build our New Mexico related research so that it can have a national impact, rather than just local.
   - Focus on key opportunities: we sometimes dilute what we’re really good at by trying to do everything?
   - Leverage our diversity
   - Find ways to reward faculty who want to undertake research initiatives
   - Faculty mentoring to teach the fundamentals of research. For example, consistency & showing impact are markers of successful research.
   - Become morenimble in obtaining and administering seed funds can be obtained from small grants, private donors, and foundations. RAC (at the VPR level) and Humanities Working Group Seed Funds (in A&S) are two ways to get funding for new initiatives, Research Allocation Grants (?) in COE.
   - We need consistency in administration to work with research labs. There should be a strategy to have young faculty come in to areas where we have marked distinction so that it can continue. For example, UNM has been top in the areas of quantum physics and material science. However, we don't have a strategy to keep this going. (We were once in the top 3 programs in quantum physics and now we're in the top 25.)
   - Encourage interdisciplinary research
     - We can take simple steps that encourage understanding between units: example a PIVOT training that helps faculty in one unit understand how the rest of the university will view you: update profile
     - Get faculty out of the department/college to communicate with faculty in other departments/colleges.
     - Create spaces that foster interdisciplinary discussions. Create more spaces for collision, convergence, sociability.
     - Bring people who need the same tools into the same structure
   - Invest in Cluster hires, particularly in these research areas:
     - health and prosperity of unique NM populations (leverage that the RWJ foundation has an endowed chair in race and health).
     - Water in the west (this was attempted in 2013 and not executed due to lack of funds)
     - Renewable energy technology (building on EPSCOR efforts)
   - Consider a Dean of interdisciplinary studies
• Minimize structural barriers to success
  o The chain of command must have a consistent message, or several succinct messages, not a dozen.
  o Anytime you add requirements remove one (don’t over-regulate)…UNM is too focused on legal liability
  o create expedited ways to get course codes listed across departments

2. Find ways to quantify research excellence that are metrics-based but multivariate.

Funding is the dominant metric in science and engineering, but not in the Arts and the Humanities and Education. Not all disciplines need funding to produce excellent scholarship.
• The impact of education research goes beyond quantitative metrics such as graduation rates and grades; develop ways to measure and encourage wider impacts of education research
• The National Endowment for the Arts (NEA) has two primary criteria for arts funding 1. Artistic Excellence; and 2. Artistic Merit. NEA Chair Jane Chu added the following: 1. Cultural preservation; 2. Cultural transmission and 3. Having the highest level of professional involvement demanding artistic rigor.
• For science and engineering, consider cumulative citation counts, h-indices or other impact factors for departments and centers to see where UNM research is having high impact. This is not a sufficient metric, and it is not applicable to humanities, arts and education where research metrics are less easily quantified, but it is a good coarse grained way to see impact in technical fields (i.e., CHTM reports a cumulative h index of 90) through web of knowledge or google scholar. Promote and invest in departments and centers that have had high impact.

3. Identify specific research areas for investment
• New seed funding is needed for large-scale, general interdisciplinary research.
• More seed funding for technology transfer from industry and government sources.
• Neuroscience is an untapped area between main campus, the Mind Research Network and HSC.
• Rotate what you are investing in (e.g. engineering, arts, etc).
• Focus on problems vs solutions (technologies)
• Native American Studies is an area of tremendous, untapped potential. "Indigenous design" is one of the first such programs in the world.
• Develop interdisciplinary research centers based on fundamental questions; centers should support faculty through proposals, pre- and post-award
• Encourage more clinical and applied research: examples in COE: effect of health and exercise on learning, clinical research in COE
• Develop basic science and health science linkages. Strongest connection is engineering and health science. Really the only concerted effort, could be more work between CASAA, Psychology, Biology, and Health Science.
• We should pursue health policy, especially in health disparities
• More work in Computer Science, particularly computer security, and Internet of Things.
• We need consistency in administration to work with research labs. There should be a strategy to have young faculty come in to areas where we have marked distinction so that it can continue. For example, UNM has been top in the areas of quantum physics and material science. However, we don't have a strategy to sustain excellence. We were once in the top 3 programs in quantum physics, but we have dropped in the rankings.

4. Leverage existing resources & Potential Partnerships External (funders and institutions)
• Leverage relationships and potential partnerships with the national laboratories (Los Alamos Air Force Research Lab and Sandia) for unique opportunities for research and research funding, and research collaborations (lots of data scientists at LANL want UNM partnerships). An example is to leverage our connections to labs in ecological research, climatology and high performance computing to develop where climate models. However, we have little work on how we might use technology to solve the climate change problems.
• More joint applications for federal and foundation funding. UNM can be an attractive partner given its location and designation as a high Hispanic-serving and high Indigenous-serving institution.
• Make connections with institutions participating in large initiatives (e.g. manufacturing center w/ California & NY was funded at $100 million. More efforts to leverage these larger collaborations/consortia.
• Build on the success of the Faculty Research Development Officer (FRSO) model which is yielding benefits. Explore opportunities to pool resources among departments and colleges and explore how pre-award and post-award can optimize use of research administration talent.

5. Suggested strategies for creating productive research environments
• Develop more effective large research centers at UNM by removing barriers to success. Category III Centers have led to excellent research, but we need to remove complicated budgetary relationships among Centers and academic units
and lower the barriers to collaboration between affiliated centers like the Mind Research Network.

- More joint hires across disciplines to support interdisciplinary research
- Collaborations with the Health Sciences Center, particularly Cancer Research Center and other basic cancer research
- One-stop structural organization within our colleges that supports better communication with faculty about their research
- Inclusive Excellence (defined by the University of Denver statement) is the recognition that a community or institution's success is dependent on how well it values, engages and includes the rich diversity of students, staff, faculty, administrators, and alumni constituents. More than a short-term project or single office initiative, this comprehensive approach requires a fundamental transformation of the institution by embedding and practicing IE in every effort, aspect, and level of a college or university. UNM should use the Inclusive Excellence framework to transform how it values and promotes research.

6. Facilitate more faculty-led initiatives which almost always work better than top-down driven programs.
   - Identify potential synergy across departments and units and provide staff and technical support to coalesce research efforts, such as in the Center for Stable Isotopes, and proposed centers in Bioinformatics and Genomics and Spatial Data Analysis.
   - Provide seed funds for collaborative faculty groups, most notably in Humanities (NEH-HSI working group), Nextgeneration PhDs in Humanities.
   - Institutionalize key resources for multi-investigator efforts. Right now we are looking to create a program office for multidisciplinary training grants, and core strength in research computing.
   - Develop broader and more meaningful connections between Natural and Social Sciences and Humanities, probably surrounding critical problems like water availability, borderland issues, etc.
   - Generate Faculty excitement and sustained effort. We convened a symposium recently to ask faculty to present their research in lightning talks and do group discussions about topics, synergy, and future directions in A&S.

7. Potential Partnerships External (funders and institutions)
   - Current and future relationships and potential partnerships with the national laboratories (Los Alamos National and Sandia) present unique opportunities for research and research funding.
   - More joint applications for federal and foundation funding. UNM can be an attractive partner given its location and designation as a high Hispanic-serving and high Indigenous-serving institution.
• Connections with institutions participating in large initiatives (e.g. manufacturing center w/ California & NY was funded at $100 million. More efforts to leverage these larger collaborations/consortia.

Recommendations 2: From Surveys (focused on Criteria)

• **CETI - Center for Evolutionary and Theoretical Immunology**: Research receives remarkably little attention at UNM. Much, much more needs to be done to support the activities of PIs that work so hard to generate the proposals that support the entire enterprise. They are the real heroes at UNM because they are often the superb teachers as well. UNM has a long way to go to make their community of researchers feel better in their interactions with the administration. Imposition of inviolable deadlines regarding submission (often well before agency deadlines), abrupt treatments and decisions from administrators perceived to have little knowledge of and talent for research really rankle. Researchers are the ones with the exceptional talents that UNM must figure out how to absolutely cherish, and preemptively support including with salary increases, or we will lose them to more research-friendly environments.

• **EPSCoR/DataONE**: Research excellence at UNM seems to be recognized when it is good research focused on a narrow, disciplinary topic. I do not believe that large, transdisciplinary and interdisciplinary research projects are valued to the same extent that they are at most major top-flight research universities.

• I am uneasy about the continued efforts to measure research productivity as the metrics often seem to be one-sidedly favoring stem disciplines. In our department, we also do research has may not have a new and unique quality but provides a public service in editing texts, translation, book reviewing for academic journals, writing encyclopedia entries, etc. All of these activities contribute to our discipline and its success, including the students’, but do not get measured by strict book or scholarly article metrics and thus fail to capture adequately what we do. Therefore, instead of trying to force every discipline on campus into the same rubrics, compare apples to apples and not apples to oranges.

• **Maxwell Museum of Anthropology** is a non-academic unit; to the extent that staff teach or serve on committees, they do so through overlapping or adjunct appointments in academic departments. That causes us to have a low profile internally, since so much of UNM’s introspection starts with the assumption that there are academic units and there are ‘support’ units. But we do original research! And we do involved students in that research!

• Include training high school and undergraduate students in research as a legitimate research activity, and recognize the excellence of such programs at UNM.

• Do not use "one size fits all" frameworks to evaluate research

• Encourage fairness in supporting and evaluating research at all levels (chairs, deans, OVPR)
Recommendations 3. From Prior Reports

Ways to support excellent research & improve the research process
- Hire across departments in a synergistic way; enhance communication within and among principal investigators to identify emerging areas; conduct research symposia
- Collaboration and coordination across groups and departments; trans-disciplinary research, education, and graduate training proposal development
- Provide University funded grants for interdisciplinary public scholarship
- Provide resources for ongoing support of community and university members to formulate and advance collaborative research initiatives.
- Building institutional commitments to service learning, civic engagement as an integral component of faculty research.
- Establish doctoral level internships with community non-profits with a CES focus.
- Shift and revise the professional reward structure and practices so that a diversity of routes to academic excellence and innovative forms of scholarship is possible for faculty; structures that “support engagement rather than disdains it.”
- Explicitly recognizing community-engaged scholarship as scholarship.
- Offer Fellowships for graduate students and postdocs from underrepresented groups, as most tier 1 research universities do.
- Education initiatives that discuss race, class and gender issues improve success and retention of underrepresented students and faculty. Invest in research and education on these topics.
- Need “articulated procedures and policies available to faculty who wish to establish interdisciplinary study programs” as well as administrative and financial support. Overcome Obstacles 1. Rigid organizational structure and administration silos 2. Inflexible course and degree requirements that inhibit approval of new courses 3. Department/discipline-centric hiring and promotion guidelines 3. Inadequate funding and ongoing support for ID programs at all levels 4. Marginality of ID research, teaching, service, advising, and mentoring. Develop "An Entrepreneurial Model for the Active Management of ID Programs at UNM". Explicitly fund ID efforts through University College and OGS. Develop procedures for hiring, evaluating, and promoting ID program faculty and Graduate Degrees in Interdisciplinary Studies.

Specific research areas in which UNM should invest
- D2K - Data to Knowledge Initiative, Bioinformatics, Race and Ethnicity; Water Science and Policy; Earth Systems; Energy Science and Policy; Latin America - Biodiversity, Social Research, Economic Research
- Latin American studies; nanomaterials; learning and well-being of New Mexicans; spatial data analysis research and data visualization; remote sensing and the
internet of things; sustainability; high-performance research space for optics and imaging

- Establish a “Community Scholar in Residence” program to support CES sustainability across all disciplines.
- Develop a ladder of early career recognition awards for junior or pre-tenure faculty involved in CES and extending this to more distinguished career recognition awards for tenured faculty research in all disciplines.
- Develop University recognition awards for CES Research Teams to promote interdisciplinary research.
- Existing resources the Research Strategic Plan should use or leverage
- Extensive support for technical staff supported by A&S I&G budget. Extensive network of research infrastructure (FRSOs; Research Analysts in Departments)
- FRDO, FRSO programs; seed monies from RAC, OVPR, and Units; collaborative hires (i.e., across departments and centers) in key research areas (i.e., Bioinformatics); State support for research start-ups
- Alumni organizations
- Community advisory councils
- Leveraging public organizational linkages that exist in the state
- Private foundational support for faculty CES
- Build a coalition of business, non-profit and government leaders to advance a CES focus among IHEs and forge links between academia and the social sector
- Partner with other IHEs to share resources in support of interdisciplinary CES that addresses state-wide issues