SOURCE 2024

State of University Research, Creativity, and Economic Development

Will and how can NMSU be distinctly Carnegie R1?

Prepared by LEADS 2025 Team 2.0 and Council of Associate Deans for Research

NMSU Research Engages our Communities and Transforms the World!

We are New Mexico's land-grant and space-grant institution, with Hispanic and Minority-Serving and First-gen Forward designations. We leverage our interdisciplinary character across five academic colleges — (1) Agricultural, Consumer & Environmental Sciences (ACES); (2) Arts & Sciences (A&S); (3) Business; (4) Engineering; and (5) Health, Education, & Social Transformation (HEST). Together with the Graduate School and the Honors College, we take pride in engaging graduate and undergraduate students in important research with both local and global implications.

We have nation-leading expertise in water and energy research, STEM education research, aerospace engineering, cybersecurity, agriculture, and advanced manufacturing. Our research, scholarly, and creative activities in the arts and humanities are expanding; we are experiencing significant growth in allied health, business, educational, and social sciences research; and we are a key contributor to regional workforce development. New Mexico State University (henceforth NMSU) uses home-grown, place-based and community-engaged research approaches that allow us to realize our commitment to socio-economic mobility, justice, and transformation that serves the diverse and distinct needs of the people and communities across the Borderlands, New Mexico, and beyond. NMSU transforms the world by engaging our communities!

In 2025, NMSU will achieve the prestigious designation of Carnegie R1 university. This milestone represents a transformative moment for NMSU, marking a significant era in our history. As a Hispanic Serving Institution (HSI), we are transitioning from merely enrolling Hispanic students to truly serving them. ***As a Carnegie R1 institution, we must transition from being one in name only to being one distinguished by culture, operation, and reputation.***

An examination of universities that embody the Carnegie R1 status in culture, operation, and reputation reveals two key advantages: superior student success metrics and greater resilience against the projected enrollment decline. NMSU stands out among its academic peers, prompting the crucial question: ***Will and how can NMSU be distinctly Carnegie R1?***

This document contains answers to 21 probing questions about NMSU's research, creativity, and economic development ecosystem. Recommendations, while preliminary, are designed to spur campus debate. LEADS 2025 Goal 2 Team 2.0 looks forward to vigorous, forward-looking conversations with faculty, students, staff, administration, regents, alumni, and community, regional and New Mexico stakeholders.

Note: For the sake of brevity, the term "research" throughout this document refers to basic, applied, and developmental research and includes all efforts associated with externally funded public service, instruction, and outreach.

University-wide and college specific research strengths as of 2024

NMSU • AI and Machine Learning • Biomedical and Health Science • Energy, Environment, and Water • Food Production, Safety, Science, and Security • Transforming STEM Education • Arts and Culture	***College of Agriculture, Consumer and Environmental Sciences (ACES)*** • Agricultural production for water-limited systems • Artificial Intelligence • Sustainable management of water resources • Ecosystem function and climate resilience • Animal health and welfare • Bioengineering, food processing, marketing, and supply chains • Family and community education, development, and health
College of Arts and Sciences (A&S) • Artificial Intelligence • Biomedical & Behavioral Research • Digital, Performing and Creative Arts • Quantitative and Computational Methods • Social Justice & Society • Southwest Border & Climate • STEM Ed and STEM Outreach	**College of Business** • Economic Development, Energy Economics • Supply Chain/Operations Management/Logistics & Transportation • Organizational Behavior /Human Resources Research • Information Systems, Business Analytics, Artificial Intelligence • Applied statistics in health and medical science • Strategic Management
College of Engineering • Water Engineering Research • Power Grid • Hypersonics • Advanced Manufacturing • Cybersecurity and Machine Learning • Engineering Education	**College of Health, Education, and Social Transformation (HEST)** • Equity Science • Biomedical and Health Science • STEM+ Education • Borderlands Research • Applied/Translational Research

Carnegie R1 Trajectory

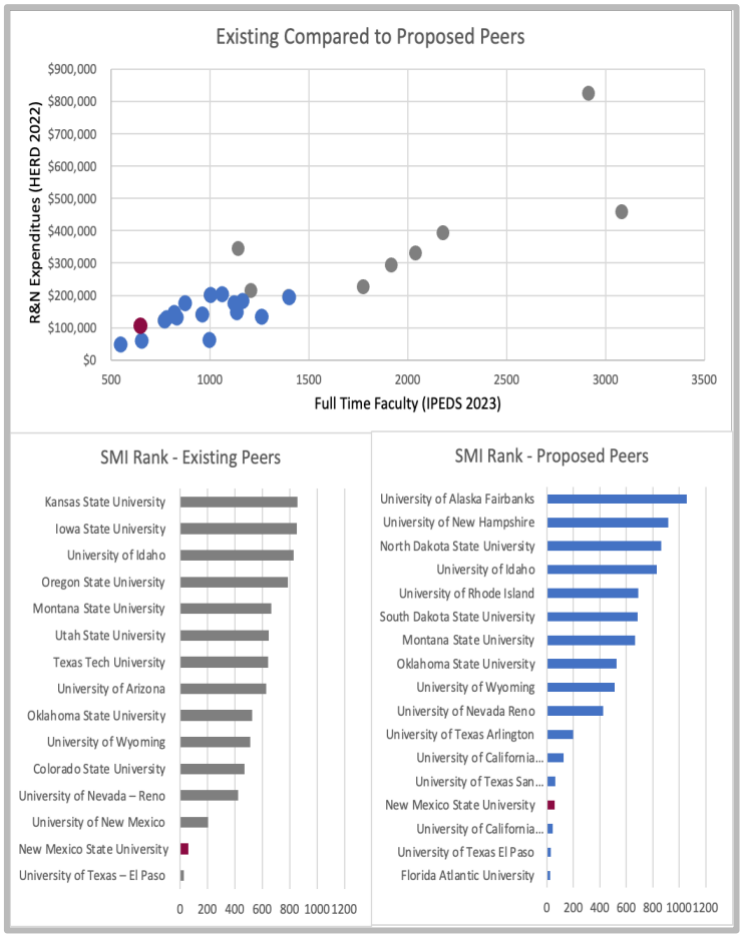
1. What peer group is appropriate to benchmark and track NMSU's Carnegie R1 trajectory?

For the most part, universities create lists of peer institutions to benchmark and compare, plan strategically, address accreditation and accountability, and for external validation.

Existing 15 university peers (grey) include 13 Land Grant institutions, 13 Carnegie R1 and 2 Carnegie R2 institutions, and 5 HSIs. Nine existing peers are from EPSCOR states and only two are in the top 200 2023 Social Mobility Index.

A proposed list (blue) of 16 university peers includes 13 Land Grant institutions, 9 Carnegie R1 and 7 Carnegie R2 institutions, and 6 HSIs. Eleven peers are from EPSCOR states and six are in the top 200 2023 Social Mobility Index.

The existing group of peers represent a range of 650 to 3084 full-time faculty (IPEDS 2023) and $105 million to $824 million annual R&D expenditures (NSF HERD 2022). The proposed group of peers represent a range of 547 to 1399 full-time faculty and $48 million to $203 million annual R&D expenditures.



At 769 full-time faculty and $121 million annual R&D expenditures, NMSU (crimson) is at the lower end of both existing and proposed peers. The latter, however, are closer to NMSU in key metrics and should be used for benchmarking and comparisons.

Goal 2 Team 2.0 recommends a process weighing the proposed peer list with recently created lists of departmental peers, making changes if necessary, and approving the new peer list.

2. What are NMSU's barriers to Carnegie R1 research and creativity production?

NSF HERD data shows that Carnegie R1 universities have experienced a 70% increase in total research expenditures since 2010, while research expenditures at the remaining 500+ reporting institutions only grew by 5%. A recent NSF-funded study attributes this funding gap to the investments Carnegie R1 institutions make in the research enterprise. Minority Serving Institutions (MSI) like NMSU face specific barriers that impact an institution's research capacity: a) research support infrastructure limitations, b) implicit and explicit bias against minoritized researchers and research participants, c) inequitable partnerships between institutions, and d) exclusionary patterns in the funding review process (Pai et al., https://doi.org/10.32469/10355/98061).

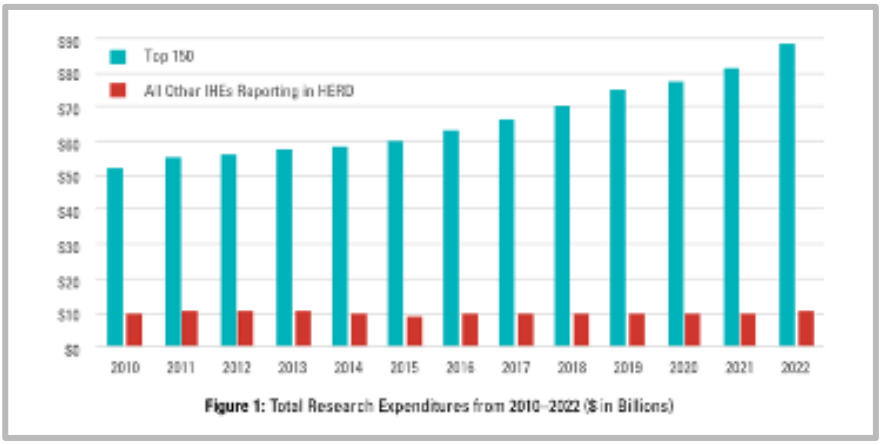


Figure 1: Total Research Expenditures from 2010–2022 ($ in Billions)

Goal 2 Team 2.0 recommends that NMSU leadership:

1. *Communicate NMSU's research identity*. Communication from NMSU's leadership (regents, president, provost, president's cabinet) is vital to NMSU's successful and sustainable transition to a Carnegie R1. NMSU leadership must clearly and consistently position NMSU's research as an institutional strength that drives student success. This research identity should be communicated to the broadest possible audience, including state and federal governments, federal agencies, industry partners, and philanthropists.
2. *Prioritize effective research service*. NMSU leadership must establish a service (see Question 3) culture that enables units to respond to research-related requests through distributed authority/decision making, leading to team-based problem-solving and increased efficiency, especially within:
   - Facilities and Services
   - Purchasing
   - Sponsored Projects Accounting
   - Human Resources
3. *Invest in research infrastructure*. According to the National Science Foundation, "increasing capacity and access to post-award research support and service infrastructure is critical to lessen administrative burden and maximize participation in research activities." Critical investments (see Question 5) in research infrastructure, personnel, programs, and equipment will allow NMSU to create a nimble research enterprise that will increase expenditures, secure large and complex inter-disciplinary research projects, and grow the research-based student recruitment and success platform.

3. What kind of research administration does Carnegie R1 NMSU merit?

Research administration is the process of managing and supporting research activities in academic, governmental, or industrial settings. Research administration professionals at NMSU provide administrative, financial, ethical, and regulatory guidance and assistance to the university research community. NMSU research administration includes the central oversight of research development, pre-award and non-financial post-award administration, and research compliance. Research Administration Services (RAS) manages research development and pre-award and non-financial post-award administration, while Research Integrity and Compliance (RIC) manages the latter and all associated committees including the Institutional Animal Care and Use Committee (IACUC), Institutional Biosafety Committee (IBC), and Institutional Review Board (IRB). RAS and RIC staff report directly to the associate vice president of research administration in the Office of Research, Creativity, and Economic Development (henceforth RCED).

A Carnegie R1 NMSU merits skillful, service-oriented research administration. High research activity should be supported with efficient, customer-driven procedures that foster research synergy while maintaining full compliance with institutional and sponsor guidelines.

RCED first took these steps in 2018 when all the previously mentioned operations above were merged under the associate vice president of research administration followed by the implementation of state of the art, modular electronic Research Administration (eRA) software beginning in 2022. These steps have created one central location for the needs of the research community.

Goal 2 Team 2.0 recommends RCED, with its firmly placed central location for research support, should be given the opportunity to provide central oversight of post-award financial areas that are in direct contact with PIs and their project teams. These functions currently reside in NMSU Office of Administration and Finance.

4. Does the physical location of the Office of Research, Creativity and Economic Development (RCED) matter?

RCED is currently located in Anderson Hall (PSL), a secured building that requires visitors to sign in and be escorted. The physical isolation of RCED communicates a lack of support for, and disengagement between, RCED and the research community. Furthermore, RCED is the only vice president led campus unit that pays rent for its space.

Creating a campus climate that prioritizes research and research support requires the RCED office to be open, welcoming, and easily accessible. An accessible physical space for research support fosters collaboration, trust and better coordination to support principal investigators from pre- through post-award.

If moved into an openly accessible research space, RCED could offer:

- *One-to-One Help via Office Hours*: Regular office hours can help faculty connect with multiple RAS and RIC staff in one location and alleviate email burden for faculty and RCED staff.
- *Research Collaboration Space*: Collaboration spaces could support new cross-departmental research collaborations as well as the facilitation of funded projects.
- *Centralized Research Trainings Space*: Hosting all research-related trainings in a single space creates a culture of learning and belonging within the research enterprise.
- *Increased Grant Support Coordination*: RCED staff/administration, associate deans for research, and other grant support units could meet regularly to streamline their activities.

Goal 2 Team 2.0 recommends RCED's location needs to be at a central location on campus, housed at no cost to RCED, in a building familiar across departments and units, designed for collaboration and trainings. Locations that meet these criteria might include[1]:

- Hadley Hall (RCED space/renovation is currently stalled)
- Education Services
- Teaching Academy

[1] Note that these locations are given only as examples of centrally located spaces.

Carnegie R1 R&D Growth

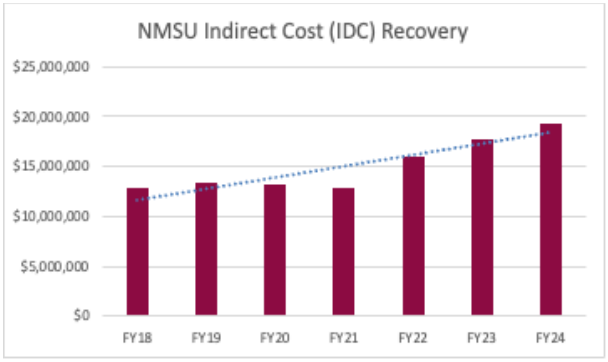
5. Should NMSU continue to focus on increasing R&D expenditures?

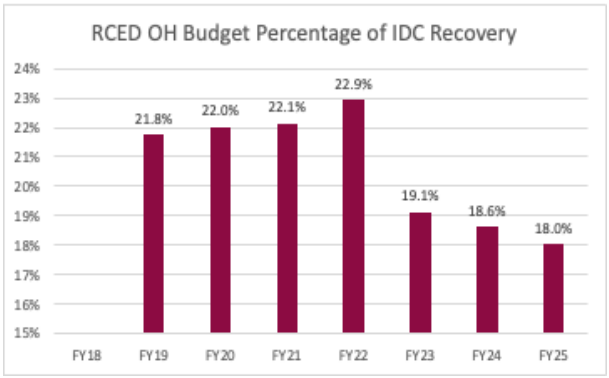
As noted in the introduction, NMSU will achieve the prestigious designation of a Carnegie R1 university in 2025.

A Chronicle of Higher Education article published last year reported the revised benchmark for obtaining the prestigious Carnegie R1 designation will be an annual expenditure of $50 million in research and development (R&D).

Since FY18, NMSU's annual R&D expenditures increased 35% to near $130 million. When tenured/tenure track faculty workload effort dedicated to research and scholarship is accounted for (see Question 8), annual R&D expenditures will exceed $140 million, a significant part of NMSU's annual budget.

During the same period, indirect cost recovery increased by 50% to over $19 million. Apportionment to RCED has not kept pace.





Notably, NMSU surpasses the new Carnegie R1 R&D expenditure criteria. However, future state appropriations and enrollments may decrease, or remain static. R&D funds from federal, state, industry, and local governments in the form of grants and contracts represent potential revenue stream growth and consequent support for faculty, staff, and students.

Goal 2 Team 2.0 recommends NMSU align its IDC recovery budget to match its Carnegie R1 ranking. To stimulate, continued growth of research expenditures and IDC, RCED should be assigned 23% of the previous fiscal year's IDC recovery starting in the FY 2026 budget. Increased investment in RCED will support Question 2 recommendations to prioritize effective research service and invest in research infrastructure.

6. Should NMSU continue to focus on increasing non-science and engineering R&D expenditures?

As of 2021, private foundations provided $3.9 billion to support the arts and humanities, and national funders (NEA, NEH, NSF's SBE directorate) funded ~$580 million to support the arts, humanities, and social sciences (Grantmakers in the Arts, Annual Arts Funding Snapshot 2024). NMSU has room to grow external funding for non-STEM research. Since 2019, NMSU has averaged $1.3 million in non-STEM expenditures.

The arts and culture industry are vital to New Mexico's economic development, providing one of every ten New Mexico jobs and generating $1.31 billion in wages and salaries, on par with the mining industry (New Mexico Department of Cultural Affairs). When faculty working in visual arts, theater, film, creative writing and music partner with artists and industries, they bring opportunities to New Mexico and our students.

Goal 2 Team 2.0 recommends that NMSU continues supporting non-STEM research and creativity through a strategy based on the following values:

1. *Building community.* NMSU can support a thriving arts and humanities ecosystem through:
   - Internal opportunities to build community through events, networking activities, etc.
   - Allocating faculty lines in a way that prioritizes research and alleviates teaching load
   - Incentivizing and enabling collaborative work both within NMSU and with external partners
2. *Creating large blocks of research time.* NMSU has a standard 3/3 TT teaching load across non-STEM departments. Leadership can help by:
   - Protecting "Research Fridays" as time away from mandatory meetings, courses or service
   - Dedicating shared event support for arts/humanities, freeing up 25 hours of research time/semester
   - Creating a low competition "Course Buyout" pool when grants/fellowships provide partial funding
3. *Easy grant administration.* Non-STEM researchers have little access to administrative support for grants. NMSU needs to provide more staffing and/or streamline processes to make post-award administration easier, such as:
   - Automating expenditure processes where possible
   - Accelerating post-award payments and hiring
   - Providing project management support to PIs receiving grants
4. *Expand resources and visibility of Arts, Humanities, and Social Science research.* Non-STEM research often requires travel for collaboration, access to archives, and access to specialized journals and databases. Without these resources, faculty publications and collaborative work decreases. Low-cost solutions might include:
   - Expanding database and journal subscriptions
   - Expanding individual researcher budgets (travel, start-up)

7. How can NMSU's museums and collections contribute to research expenditures?

NMSU is home to nationally important collections, including the largest collection of 19th century Mexican Retablo artworks, and the nation's largest collection of petrified wood. NMSU stewards over 600,000 biological and mineral specimens, 1.2 million objects of human history, 2+ million photographs, and 4200 artworks. These museums and special collections provide extensive outreach for NMSU, serving 26,000 visitors at NMSU and throughout New Mexico, 800 researchers, and 15-20 visiting artists/arts scholars annually.

Limited budgets and staffing have resulted in a heavy focus on outreach and/or collection maintenance in most collections units. Seventeen permanent employees and one contingent faculty member run NMSU's eight collections; several faculty directors are the sole employees of a collection with < .05 FTE dedicated to their collection duties. Some collections receive $0.00 in guaranteed NMSU funding.

However, if NMSU's collections receive minimally expanded support, they can quickly raise NMSU's research profile and expenditures through externally funded research and capacity-building projects. Currently, the NMSU collections hold 9 active research grants, totaling $1.62 million; $92 million is available in federal museum funding annually.

Goal 2 Team 2.0 recommends NMSU leadership to stabilize NMSU's collections through low-to-moderate cost actions, such as:

- NMSU leadership (deans, provost, vice president for research, and president) can meet with the Collections Collaboration group to discuss expanding collections care and research capacity
- Provide summer funding or course releases to faculty directors to participate in strategic planning in the Collections Collaboration group
- Provide each collections unit with $5000 in annual funding
- Extend temporary staff positions to 5-year contracts or make permanent hires
- Fund undergraduate or graduate research positions for collections units seeking external funding
- Fund temporary, project-specific staff positions

8. Should NMSU include I&G funding for tenure/tenure track faculty research (percent workload in research) in annual R&D expenditures?

Annual research and development (R&D) expenditures are one of two criteria determining Carnegie ranking. Each year, NMSU submits data to the NSF HERD Survey, which collects comprehensive data on research and development expenditures within U.S. higher education institutions. It tracks spending across various fields of science and engineering, as well as other disciplines. The survey provides R&D expenditure data used by the Carnegie ranking system.

The portion of faculty workload committed to research annually, and the corresponding faculty salary totals, are reported by some institutions to the NSF HERD Survey. For example, University of Texas at El Paso and University of Texas at San Antonio, both Carnegie R1 institutions, include faculty workload committed to research as part of their NSF HERD Survey submissions. NMSU does not follow this practice, which lowers our overall R&D expenditure ranking.

What is the salary total for NMSU tenure and tenure track (T/TT) faculty workload committed to research annually? In FY2023, NMSU reported 582 T/TT faculty who earned a total of $59,462,597 million. If we assume average faculty workload committed to research of 0.3 FTE, $ 17,838,779 million in potential R&D expenditure was not reported to the NSF HERD Survey.

If we exclude Cooperative Extension and Exclusive Credit Faculty, the above totals change. In FY2023, NMSU reported 452 T/TT faculty who earned a total of $47,442,518 million. If we assume average faculty workload committed to research of 0.3 FTE, $ 14,232,755 million in potential R&D expenditure was not reported to the NSF HERD Survey.

Depending on the approach, if NMSU includes faculty workload committed to research, our FY2023 reported R&D expenditures would have increased from $128 million to between $142 and $145 million.

Goal 2 Team 2.0 recommends that we include faculty workload committed to research in our FY25 NSF HERD Survey report. Although the new Carnegie R1 rankings are based on $50 million in expenditures, the higher expenditure will provide a more realistic comparison with our peers, many of which follow this practice.

Cultivating Carnegie R1 Talent

9. How should NMSU hire and retain a Carnegie R1 tenure/tenure track faculty?

Recruiting, attracting, and retaining outstanding faculty to NMSU is critical to the University's future and, as a Land Grant institution, faculty with high potential in research and creative activity play an especially important role with respect to the research mission. To recruit, retain, and bloom research active faculty, they must be properly rewarded.

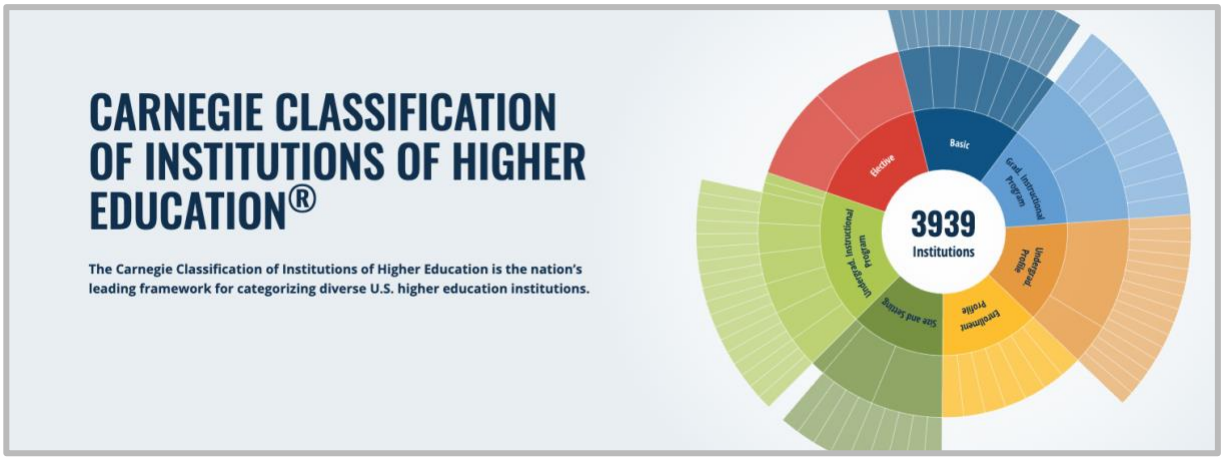
To grow R&D expenditures exponentially, NMSU will need additional investments in infrastructure, research facilities, data centers, modern libraries and archives, high-speed Internet and networking, computing resources, software and tools, and laboratory information management systems. And it will need more principal investigators (PIs).

Tenure/tenure track faculty hires at a Carnegie R1 institution are steered by strategic research priorities, which include funding availability and grant winning potential. In contrast, T/TT faculty hires at predominantly teaching institutions are mostly driven by the need to cover curricular needs. RCED's contribution to startup packages is based in part on the faculty's research/creative activity being in alignment with University's strategic research areas. NMSU's hiring approach must be flexible and able to support efforts to win large external grants (e.g., NIH COBRE, NSF ERC, DOE EFRC) that require institutional hiring commitments to sustain the long-term viability of funded research area(s).

Goal 2 Team 2.0 recommends, in line with the National Academies 2021 report, "Research Universities and the Future of America: Ten Breakthrough Actions Vital to Our Nation's Prosperity and Security," that NMSU ask the State for $2 million per year for a ten-year period. Through an equivalent NMSU Foundation match, 80 $500,000 endowed faculty professorships will be created, generating $20 thousand per endowed faculty, per year ($1.6 million annually) in perpetuity. Creation of 80 endowed faculty professorships will greatly increase NMSU's ability to attract and retain star researchers. The long-term outcome will be enhanced academic programs (student success), and greater innovation and excellence in both teaching and research raising NMSU's reputation and attracting more students to our campus.

10. Is the percentage of research active PIs to total tenure/tenure track (T/TT) faculty and research scientists consistent with a Carnegie R1 institution?

The Carnegie "Research Activity Index" has previously classified institutions as R1 (high research activity) based on research expenditures, number of research staff, and doctoral conferrals. However, Carnegie acknowledges that "while this approach is suitable for classification purposes, *we do not believe the institution-level results should be used for institution-by-institution comparison and ranking*."



To capture a more nuanced scope of research activity at NMSU, "Grants Active" faculty are those faculty who have received external funding as investigator in the last five years (2018-2023).

42 %

Grants Active TT Faculty

"Research Active" faculty are defined as those who have published scholarly work, been selected for public exhibition of creative/scholarly work (through performances, exhibitions, or screenings) or received fellowships/awards to complete creative/scholarly work in the last five years (2018-2023).

84%

Research Active TT Faculty

All T/TT faculty who report a percentage workload effort above zero must be research active. At Carnegie R1 institutions, 60-80% of T/TT faculty have grants and contracts, but percentages vary among departments and colleges (e.g., typically lower in colleges of business.)

Goal 2 Team 2.0 recommends that 60-80% of T/TT faculty at NMSU have grants and contracts, 100% should be research active, and these requirements be clearly stated in departmental promotion and tenure policies addressing differences among departments.

11. What is the percentage allocation of effort of tenure/tenure track faculty to research and how does it compare to our peers?

Allocation of effort at NMSU refers to how faculty members distribute their time and resources across various responsibilities and tasks. Each faculty member completes an allocation of effort in discussions with their department head for each calendar year. The effort is split between areas of teaching and advising, scholarship and creative activity (research), extension and outreach, and service.

Traditionally, research is considered under the area of scholarship and creativity. In 2023, the average allocation of effort in this area was 27%. However, it remains clear that some research activity gets classified under advising (e.g., graduate student) and some under extension (particularly Cooperative Extension). As such, it is not possible to do a fair comparison across colleges or discipline areas. It is even more difficult to compare this to other universities as these types of data are not typically shared externally. Clearly, an accurate and comprehensive database of faculty effort is a fundamental metric, which NMSU should measure to determine where we are and what targets we should consider setting.

Goal 2 Team 2.0 recommends that a complete comprehensive and standardized data entry to the faculty success website (previously known as Digital Measures) be a condition of the completion of allocation of effort submission each year. The allocation of effort data should be benchmarked against the University of Delaware Cost Study (UD Cost Study), enabling NMSU to compare with peers (see Question 1). In addition, this data would also be a vital input to the potential reporting of these efforts for R&D expenditure reporting (see Question 8).

12. How do we nurture and grow NMSU's research scientists?

Soft money research scientists, research engineers, and research technicians play a vital role at Carnegie R1 institutions. These are typically funded through external grants and contracts rather than institutional funds. At NMSU, research staff located in academic colleges and centers and institutes (e.g., New Mexico Space Grant Consortium, New Mexico Water Resources Research Institute, PSL) have been and are key to attaining and sustaining present levels of R&D expenditures. Non tenure/tenure track investigators also often lead capture and execution of externally funded "training grants" that promote the research capacity and graduate futures of our undergraduate students (e.g. McNair Scholars).

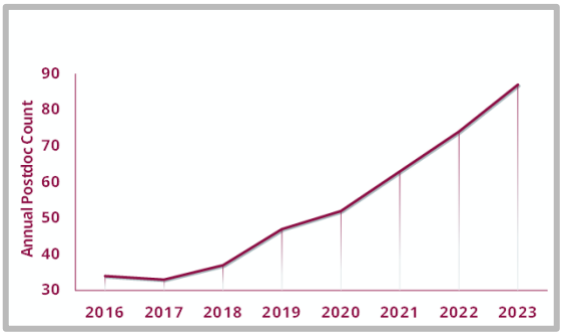
To ensure flexibility in our ability to respond to opportunities and to attract top research talent, NMSU requires solid operational roles for research faculty and research staff. To properly identify research faculty at NMSU, a clear distinction between college faculty (teaching) and research faculty should be maintained, with separate evaluation and promotion processes to acknowledge the unique contributions of research faculty. Furthermore, research faculty should be classified into the distinct titles of research assistant professor, research associate professor, and research professor, which reflect qualifications like those held by tenure-track faculty of comparable ranks. These positions should primarily focus on research activities, and the individuals should possess the necessary academic credentials and experience to conduct independent research, often serving as principal investigators on research projects.

Similarly, non-faculty researcher staff, such as research scientists and research scholars, should also be clearly defined, with roles focused on conducting research rather than teaching. A clear, merit-based promotion mechanism is also needed for research staff. The modifications required to achieve clarity and empower flexibility and identity within these two employee designations are possible with only minor changes to the current university Administrative Rules and Procedures.

Goal 2 Team 2.0 recommends that the findings of the 2020 Provost's Appointments Task Force be finalized and delivered to the Faculty Senate for consideration regarding research faculty and research staff.

13. How should NMSU invest in postdocs?

Postdocs serve a critical function within the research enterprise. In 2018, RCED began investing heavily in postdocs and a matching funds incentive program was implemented in 2019. This program has helped initiate a significant culture change at NMSU, as illustrated here. Beyond direct salary support, RCED supports the NMSU Postdoc Association (faculty fellow stipend, travel money, events), which provides mentoring, professional development, new faculty development, and activities/events that build community among NMSU postdocs.



The initial RCED investment in postdocs was in response to a Carnegie classification criterion. This is no longer the case with the new criteria, thus an assessment of the role and investment in postdocs is in order. We propose a reframing of the RCED Postdoctoral Matching Funds Program that will incentivize increasing research expenditures, increase research outputs, and continue to increase the number of postdocs.

Postdocs are essential when a large project is awarded to maximize the impact of the funds. They assist the principal investigator (PI) in conducting research, writing papers, project management, mentoring students, etc. They contribute greatly to moving large, complex projects forward by giving the PI time for large project management and coordination activities.

Goal 2 Team 2.0 recommends that RCED postdoc commitments be made when a large/important award is received and/or to match proposals requiring cost-share. In a similar function, postdoc commitments will also support centers, institutes, emerging/strength topics, and infrastructure building.

14. What is a sustainable number of PhD students at NMSU?

Ph.D. level researchers and scholars are needed within academic and public sectors to solve complex problems. Doctoral students bring skills and knowledge not widely available but vital for evaluating, designing, conducting, and interpreting research in multifaceted social, political, and economic contexts.

The number of Ph.D. students has ranged from 550 to 610 for the past five years. Only 31% of Ph.D. students held GRA positions in Fall 2023.

To progress through doctoral training successfully and in a timely manner, Ph.D. students would benefit from sustained support throughout their training. This would allow them to focus more exclusively on their studies and research instead of struggling to balance these efforts with competing part-time or full-time job duties.

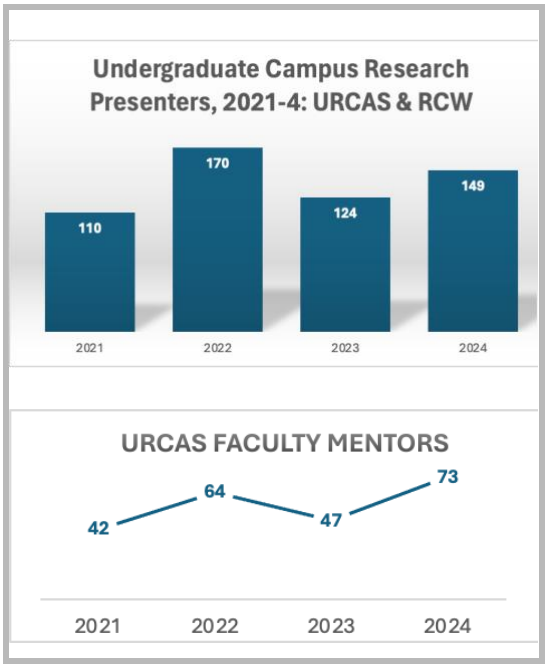
Goal 2 Team 2.0 recommends increasing institutional and State of New Mexico support for graduate students to mitigate enrollment challenges and position NMSU as a Carnegie R1 university.

Funding for PhD students at institutions of higher education relies external funding, particularly large federal research and training grants. The research endeavor under NMSU's Carnegie R1 status, therefore, will continue to be key to supporting graduate students in their academic training along with strong support from NMSU and the State of New Mexico.

15. How can we support and grow undergraduate research and faculty mentorship?

As NMSU attains Carnegie R1 status, we can strengthen our commitment to developing the researchers of the future. Undergraduate research is a high-impact learning activity that elevates academic engagement and achievement, increases access to graduate education and competitive jobs, and supports social mobility. NMSU's tradition of student participation in faculty-led projects and other mentored scholarship is rooted both in the curriculum, where students earn course credit for department and Honors capstones, independent studies, and research-intensive courses, and in grant-funded research programs that provide stipends and professional development.

Dissemination opportunities are available for all NMSU researchers and creative scholars through the Undergraduate Research and Creative Arts Symposium (URCAS; now in its 30th year) and NMSU Research and Creativity Week (RCW). Participation in these events may identify patterns in mentored undergraduate research across the university. Undergraduate participation rates in URCAS and RCW have increased since 2020, as have the number and field-diversity of faculty mentoring presenters.



Since 2022, an average of 42% of students presenting research at campus-wide symposia have been supported by externally funded undergraduate research programs. 10% of URCAS presenters are completing an Honors capstone. Next year, over 150 students are projected to take part in funded research programs.

Goal 2 Team 2.0 recommends:

1. Establishing a method of method for tracking research participation and a baseline by adding a question to the senior exit survey, e.g., "Have you participated in a faculty-mentored research or creative scholarly experience while an undergraduate?"
2. Broadening access to undergraduate research at NMSU by allocating funds to a university-wide research program—for example, $50,000 per year to support up to 5 students from each academic college. One approach might be to expand the Discovery Scholars Program, currently funded by A&S and HEST, to all colleges. Alternatively, such a program might support student-faculty teams.
3. Facilitating faculty mentorship by offering annual trainings for new mentors and further incentives for faculty who work with undergraduates, such as by providing a course release to faculty who have mentored a set number of researchers and by publicizing mentorship awards.
4. Inviting departments to set a goal for undergraduate participation in research/creative scholarship in their strategic planning

Carnegie R1 Culture

16. How do we address EID and access in research, scholarship, and creativity?

NMSU is uniquely situated through its equity, inclusion, and diversity (EID) structure in the colleges to address equity, inclusion, and diversity in research. College EID directors can seek to identify and implement unique opportunities to promote EID work through scholarships, grants, research, diversity in hiring, and other opportunities particular to their disciplines.

Utilizing NMSU's LEADS 2025 Goal 6, EID directors can also promote creative opportunities by seeking collaborative partnerships locally, and at state, national, and global levels to promote creative and diverse research opportunities for faculty and students. Additionally, EID directors, colleges, and faculty can work directly with NMSU's EID Department (Asian Pacific Islander Program, American Indian Programs, Black Programs, Latin American Programs, LGBT+ Programs) to increase intersectional research being accomplished, promote further research opportunities for students and scholars, and other opportunities such as conferences and mentoring.

NMSU must create organizational structures around tenure, service, research, and faculty satisfaction to center our primary mission as an HSI/MSI/Land Grant University while also recognizing the goal of being a Carnegie R1 is to "seek revenue to create a financial base capable of sustaining the substantial unfunded costs of competitive research faculty, staff, and facilities... defining its brand value" (Rouse et al., 2018, p. 2).

Goal 2 Team 2.0 recommends considering "servingness" inherent with being an HSI/MSI/Land Grant University be part of the promotion and tenure process making NMSU an unique Carnegie R1 institution.

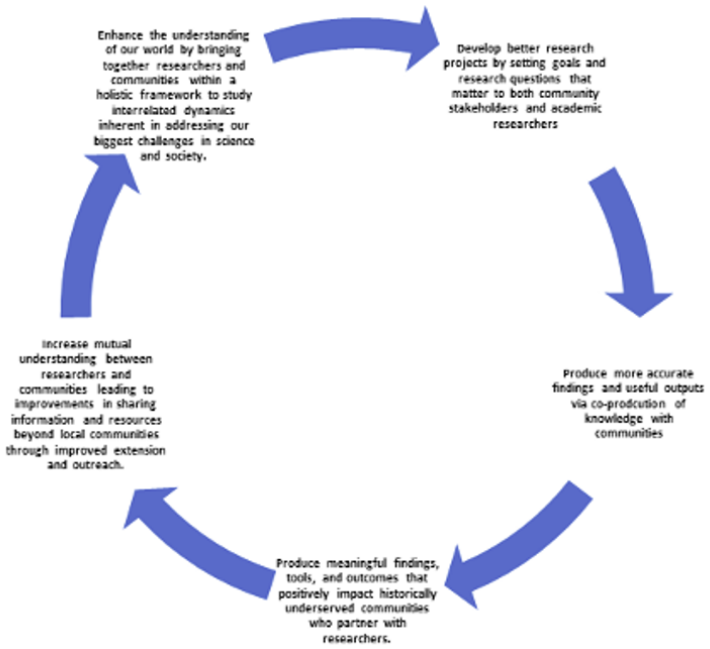
17. What role will community-based research play as NMSU transitions to Carnegie R1 university?

Community-engaged research (CEnR) will play a crucial role as NMSU transitions to a Carnegie R1 university by fostering holistic research frameworks that integrate researchers and communities to tackle societal challenges. This approach ensures community inclusion throughout the research process, leading to accurate findings and positive outcomes. It reflects regional diversity in research teams, benefiting historically underserved communities and facilitating access to impactful funding opportunities.

Promoting equity and social justice, CEnR will address health and well-being determinants, strengthen extension and outreach for broader information sharing and resource access, and engage communities in educational processes that enhance student success and social consciousness. By utilizing NMSU's community engagement strategies, including extension services and research centers, CEnR will enhance research impact and competitiveness in grant funding while upholding land-grant institution principles by fostering regional knowledge and community development.

NMSU's current strategies involving community-engaged research include:

- The New Mexico Cooperative Extension Service (CES), which collaborates with over 1,000 organizations, state and federal agencies, and other universities.
- Funded research cores and projects, such as U54 PACR – Cancer Outreach Core and MW CTR IN – CEO Core.
- Sponsored and non-sponsored faculty community-engaged research.
- NMSU Research Centers, including examples like NM WRRI, CLABS, and Agricultural Science Centers.



Goal 2 Team 2.0 recommends institutionalizing CEnR as a priority. To achieve this, NMSU should secure institutional support ensuring vocal and material backing from university administrators aligns with community-engaged research goals, mission, vision, and promotion and tenure policies. A centralized engagement center should be established as a non-academic unit to foster institution-wide commitment to community-engaged research. Additionally, a training coalition must provide education, training, and grant writing support, while continuous assessment will implement ongoing evaluation of community-engaged research efforts.

18. How does NMSU arrive at a social mobility ranking?

According to a National Center for Education Statistics study published last year, only 14.5% of students in the lowest socioeconomic quartile earned a bachelor's degree over ten years. As an HSI, MSI, and Land Grant institution, NMSU's mission is to serve the diverse needs of New Mexico through comprehensive programs of education, research, extension and outreach, and public service.

"Social mobility is linked to equality of opportunity: the extent to which people have the same chances to do well in life regardless of the socio-economic background of their parents, their gender, age, sexual orientation, race, ethnicity, birthplace, or other circumstances beyond their control. Social mobility and equality of opportunity can be measured in terms of earnings, income, or social class. Still, they can also be understood to encompass other well-being dimensions such as health and education." (OECD, 2024)

Fall 2023 Student Enrollment, NMSU System, compared to Fall 2022 (NMSU, 2024)

Campus	Students	Faculty	Staff
Alamogordo	1,088 (+52)	69 (-5)	71 (+5)
Doña Ana	6,849 (+183)	393 (-21)	288 (+36)
Grants	834 (+5)	52 (even)	30 (+6)
Las Cruces	14,779 (+511)	1,090 (+49)	2,394 (+77)
Total	23,550 (+751)	1,604 (+23)	2,793 (+127)

The value of NMSU degrees was estimated in the 2022 NMSU Economic Impact and Contribution Study completed by Arrowhead Center and Center for Border Economic Development (Winingham et al., 2023). Degree level return on investment figures is estimated by The Foundation for Research on Equal Opportunity (Bush et al., 2021).

2021-22 Degrees awarded, NMSU System

Educational Attainment	# of degrees awarded	Median Income	Net Present Value over 30 yr career	Value of Degree
High School	N/A	$37,290	$573,239	
Certificates & Associates	1,472	$44,080	$677,618	$104,379
Bachelors	2,443	$64,911	$997,841	$320,224
Graduate or Professional	862	$84,118	$1,293,100	$295,259

Goal 2 Team 2.0 recommends key metrics for social mobility at NMSU include enrollment and student success (enrollment, retention, graduation rates, acknowledgment gap, SCH/tenured faculty) and enrollment and graduation rates of under-resourced students awarded Pell Grants.

19. Will becoming Carnegie R1 change NMSU's impact on economic development locally, regionally, and in New Mexico?

Typically, Carnegie's R1 institutions have higher levels of research expenditures than R2 institutions. In addition to higher research expenditures, Carnegie R1 status may be correlated with: (1) higher institutional prestige that may result in increased student interest and enrollment, (2) higher institutional prestige that may result in the ability to attract better qualified and more productive faculty and staff, and (3) higher levels of patenting and entrepreneurship.

Assuming Carnegie R1 classification leads to higher research expenditures, a general economic impact analysis shows a $1M increase in research expenditures would lead to 14 direct new jobs, and 17 total new jobs, with an employment multiplier of 1.27. Studies have also found positive effects of research spending at universities on innovation and entrepreneurship. Kim 2019 found increased state funding for research universities leads to higher levels of local patenting and entrepreneurship. Hausman 2012 found that for each new university patent an additional 15 jobs are created. Brookings Institution also has identified multiple pathways research institutions can support regional competitiveness.

Research expenditures also support student-related research opportunities, which are particularly important for undergraduate and graduate students interested in research. Carnegie R1 status also carries prestige and endorses a university's research enterprise, which can help attract higher-level and more productive research faculty and may attract additional students. If a reclassification of the University from Carnegie R2 to R1 resulted in ten non-resident graduate students who would not have attended NMSU or another university in New Mexico, the total direct benefit to the University (assuming a two-year graduate education) would be nearly $550,000 (for the two-year stay). When multiplier impacts are included, the impact of moving from Carnegie R2 to R1, again assuming the change resulted in ten new graduate students, would be more than $900,000.

In summary, Carnegie R1 status can potentially benefit NMSU's economic impact through the following pathways: (1) enhanced recruitment of students interested in research, (2) enhanced recruitment of productive research faculty who will help increase research expenditures, (3) increased patenting and entrepreneurship resulting from increased research expenditures, (4) increased job creation resulting from increased patenting, and (5) enhanced regional competitiveness due to increased research strength.

Goal 2 Team 2.0 recommends conducting an NMSU System Economic Impact Study each year, with appropriate funding, to help assess the effect of Carnegie R1 designation on economic development locally, regionally, and in New Mexico.

20. How can Arrowhead Center support NMSU being distinctly Carnegie R1?

Arrowhead Center's mission is to promote entrepreneurship and innovation, creating economic opportunity. Arrowhead Center helps innovators, entrepreneurs, and small businesses at any stage start and grow through services, resources, expertise, and connections. Arrowhead Center serves as a convener of entrepreneurial and innovation assets internal and external to the university.

To support NMSU being distinctly Carnegie R1, commercialization of research needs to be prioritized with broad awareness, strong incentives and well-placed resources. Arrowhead Center is well positioned to lead this expansion, and currently offers a host of programs and resources to support commercialization including: (1) Intellectual Property: Arrowhead Center is the technology transfer and commercialization arm of NMSU, working with campus inventors and innovators to protect their work and ensure it reaches the broadest possible markets; (2) Aggie I-Corps: NMSU is a partner of the Southwest I-Corps Hub, which provides a series of programs to help researchers identify customers for their inventions, (3) Studio G: NMSU's dedicated Student Business Accelerator, designed to propel college students' entrepreneurial visions into thriving startups; and (4) NM FAST: Proposal development support for SBIR/STTR grants.

Enhancing resources and incentives for intellectual property commercialization produces many benefits beyond regional economic development. Outside job creation other significant benefits of an aggressive intellectual property commercialization strategy include (1) improved classroom instruction by faculty members post-fellowship; (2) improved faculty retention and attraction due to unique resources and support to commercialize research; and (3) enhanced position of NMSU as an innovator.

Goal 2 Team 2.0 recommends establishing commercialization of research as a university-wide priority in support NMSU being distinctly Carnegie R1. Two initial steps are:

1. *Intellectual Property and Commercialization Training Modules*: Introduction of new modules in annual NMSU training for faculty members and research assistants to build awareness of the NMSU IP policy, and resources and opportunities for commercialization.
2. *Faculty Entrepreneurship Pathways*: Modeled after Arizona State University's faculty entrepreneurship programs (ASU, 2024), develop opportunities and resources for faculty members to lead their own startups, hire entrepreneurs to lead startups based on their inventions, train students and postdocs to become entrepreneurs, or license their technology. To support these pathways, prioritizing work on newly disclosed intellectual property is key to accelerating the process. Arizona State University does this through 2-year fellowships for faculty members designated with high-value intellectual property. During this fellowship, researchers have their teaching load reduced, gain access to entrepreneurial advisers and funding to advance their technology to a stage that could be commercialized or licensed.

21. How do we craft a positive, forward-looking Carnegie R1 narrative?

NMSU must establish a clear brand identity and institutional message that highlights its strengths as a research institution. This messaging should emphasize the significant benefits of research, targeting both internal and external audiences through a cohesive campaign. The core message should convey that research offers a high return on investment, provides valuable student training opportunities, drives student recruitment and retention, fosters workforce and economic development, and develops innovative solutions to major challenges in science, technology and society.

Goal 2 Team 2.0 recommends a storytelling approach will be highly effective in conveying these impacts, with research impact stories clearly illustrating the benefits. These stories should align with NMSU's land-grant mission, showcasing how research promotes social mobility, contributes to economic development, and addresses global challenges. Additionally, the narrative should highlight the importance of gift-giving as a driver of research opportunities.

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