Research Opportunities for Science Educators (ROSE)

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Version: 1.00 **Date: March 27, 2025**

Mission

The ROSE Program energizes and enhances science teaching in New Mexico by leveraging the research resources of the University of New Mexico (UNM) and the educational resources of the State of New Mexico Public Education Department (PED). The central activity is an authentic research experience in which teachers (ROSE Scholars) join ongoing projects for first-hand participation in discovery-based research. The embedded Scholars see firsthand "how science is done" and the interdependence of various disciplines and subfields while working with faculty and student researchers. Scholars are selected based on the underrepresented minority (URM) and economically challenged student populations of their schools and their own scientific interests and background. They return to their classrooms bringing new ideas, tools and enthusiasm to share with students. From this core experience, ROSE will assist Scholars statewide in building a community to share experiences and educational resources.

ROSE will

-improve the quality of science education in NM schools by refreshing knowledge and inspiring confidence in middle and high school teachers

-forge connections between UNM and schools by acquainting teachers with university resources and educating UNM faculty on issues facing the schools

-incorporate K-12 and higher education faculty into a collaborating community of STEM educators statewide.

ROSE Annual Report for 2024

Executive Summary

ROSE continues to provide high-quality research experiences to science teachers from across New Mexico, improving their content knowledge and confidence while helping to build ties across the STEM education community.

The fourth summer of the ROSE program attracted over 70 applicants and brought 28 of these to UNM as Scholars (increase from 22 in summer 2023). Most (85%) of the Scholars teach at schools with over 70% minority enrollment, and most (>60%) teach at schools with >50% economically challenged students. About 80% of the Scholars teach at schools outside the Albuquerque metropolitan area. Scholars worked on research projects with an expanding faculty pool of 21 mentors from Arts and Sciences, Engineering, Pharmacy, Medicine and Education and Human Sciences.

The summer research session ran for five weeks from Monday June 10 to Friday July 12, 2024; roughly 3/4 of the Scholars stayed in the UNM (University of New Mexico) dormitories. Research projects ranged from the computational sciences (molecular modeling, evolutionary theory) to molecular synthesis, to organismal biology and ecology. Scholars presented their results to each other as posters which could be taken back to their classrooms for the academic year; in addition, tours allowed Scholars to visit other UNM labs and hear from other mentors about the longer-term research goals. Scholars also toured the Museum of Southwestern Biology and attended workshops on grant proposal writing and research mentoring.

Contact with Scholars continued during the academic year to variable degrees, including campus visits and online discussions. In the follow-up survey in Fall 2024, all responding Scholars indicated that ROSE had changed the way they teach, with new classroom activities and approaches and increased self-efficacy regarding teaching science concepts (50%) and practices (67%). Most (87%) indicated that ROSE increased their motivation to teach science, and one Scholar wrote that “I walked into the summer burned and questioning my life choices. I left ROSE excited for the upcoming year and teaching high school science.”

ROSE organizers continued to pursue a stable funding model with the state of New Mexico, requesting expansion funds from the HED (Higher Education Department) RPSP (Research and Public Service Program). However, no additional HED funds were obtained and PED (Public Education Department) will not provide ROSE funding in FY25. ROSE now has a formal reporting path to the UNM office of research and has hired a quarter-time program coordinator to assist with logistics, but lack of stable funding is a threat to the continuation of the program.

Priorities for the coming year include establishing a stable, ongoing funding model, developing methods for Scholars to implement more research-based activities in their classrooms, and developing longer-term methods to evaluate program impact on teachers.

I. History

ROSE began as a pilot project in 2021 to provide statewide outreach to public schools and their science classes by embedding teachers into authentic research projects at UNM. With support from NM PED, eight science teachers from across New Mexico came to join ongoing research projects in UNM's department of Chemistry and Chemical Biology (CCB) for 4 weeks in summer. The number of applicants (40) and teacher responses (overwhelmingly positive) encouraged UNM and PED to continue and expand the program.

In 2022, the program secured increased funding from the Math and Science Bureau of PED and from the HED RPSP program (categorical funds for Teacher Pipeline) which permitted an expansion to 20 teachers (Scholars), most of whom were housed in UNM dorms for the 5-week summer session. A quantitative survey approach was used for program assessment, and both Scholars and faculty mentors had very positive responses.

The 2023 research session hosted 22 Scholars for 4 weeks, and the mentor group included faculty from 3 A&S departments (Chemistry, Biology, Earth Sciences), Chemical and Biological Engineering and Pharmacy. In the October follow-up survey, Scholars responded that ROSE had changed the way they teach, reporting increased self-efficacy regarding teaching science concepts (67%) and practices (89%). Following the summer session, ROSE proposed a more formal organizational structure reporting to the OVPR.

The program continues to evolve in response to feedback from Scholars and other stakeholders, hoping to significantly benefit improve the STEM education ecosystem by improving the skills, confidence and enthusiasm of science teachers across New Mexico.

II. Publicity and Scholar Recruitment

The website (https://UNMROSE.unm.edu) served as the principal outward 'face' of the ROSE program through the recruitment period and the summer research session. Photos and PI research descriptions were updated as new items became available, and lists of Scholars were posted for each summer session. News stories ran on the departmental website before the summer research session and on the UNM news site after the summer session.

Advertising for the 2024 session began in Fall 2023 and included a table display at the annual NMSTA conference (October 2023 at San Juan College in Farmington) as well as online mechanisms. A preliminary advertisement (informational, but no online application available) ran in PED's STEM Connect newsletter in October of 2023. The first advertisements containing the online application link ran on the NMSTA website in January and early February 2024 and in STEM Connect during the same period (text for all ads can be found in Appendix A). Also in late January, recruiting emails were sent to the 2021 and 2022 Scholars and to superintendents of all NM school districts (including charters). Both the NMSTA and STEM Connect newsletter are 'opt-in' channels which teachers must sign up for; we have not found a comprehensive email list for science teachers in NM.

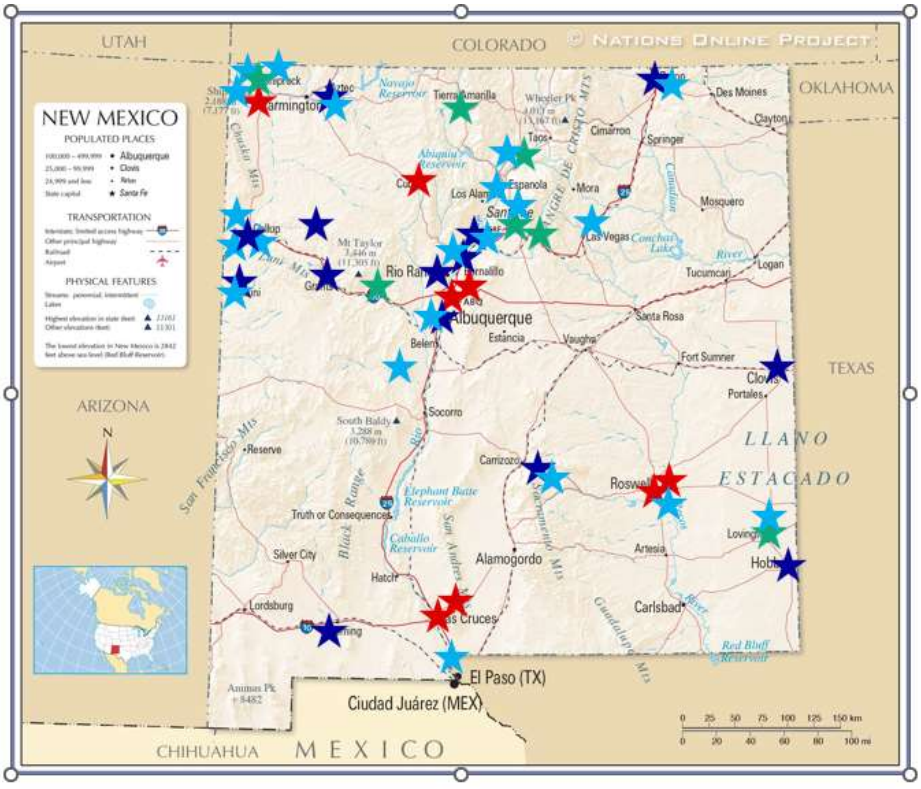
III. Scholar Selection

The ROSE online application for summer 2024 went 'live' on January 15 with a best consideration date of March 1. The first round of application acceptances had a target date of March 17 to be followed by Scholar acceptances on March 29. The application used Survey Monkey and was operated by UNM ROSE organizers.

We received 80 completed applications by the best consideration date (Appendix C), the largest number yet for this program. The organizing committee evaluated applicants based upon student demographics at their schools, geographic distribution, professional preparation, the ability of PIs to accommodate returning Scholars and short-answer questions about motivations. Demographic data obtained from the NM PED STARS site (https://webnew.ped.state.nm.us/bureaus/information-technology/stars/) included percentages of Hispanic and Native American student populations, English language learners and economically challenged students. Professional preparation data included self-reported academic degrees, years taught and subjects currently/recently taught.

Acceptance emails were sent to 25 applicants on March 13 asking for a response by March 29; responses were overwhelmingly (90%) positive. Additional acceptances were sent out in April, as funding became more definite. Of the 30 applicants who accepted offers from ROSE, two eventually declined due to changes in their summer plans.

Geographic distribution: The 2024 Scholar cohort of 28 teachers (Appendix D) represented schools from across the state, including 14 returning Scholars from Shiprock, Alamo Navajo reservation, Rio Rancho, Santa Fe, Bernalillo, Gallup, Santo Domingo, Raton, Penasco,



School District Key:

- **2021 Scholars**
- **2022 Scholars***
- **2023 Scholars***
- **2024 Scholars***

***New/underrepresented districts**

Aztec, Lovington, Valencia county and Albuquerque. The 14 new Scholars included 4 from southern NM (Anthony, Capitan, Roswell, Gadsden) and others from Los Lunas, Espanola, Kirtland, Las Vegas, Zuni, Chama, Shiprock and Albuquerque. Two Scholars teach at Albuquerque schools, with four others teach in the metropolitan area (Bernalillo down to Belen). While the majority of Scholars teach in the northern half of the state, the presence of 5 Scholars from southern NM represents a higher number than in previous years.

Student demographics: The 2024 Scholars typically teach at schools with high percentages of Hispanic, Indigenous and/or economically challenged students, all groups cited in the Yazzie-Martinex decision of 2018. Six of these schools had >90% Indigenous students, while 9 schools had >80%. Seven of the schools have over 80% Hispanic enrollment, while 11 had >60%. Eight of the schools had over 90% economically challenged students, while about half had over 50%. In addition, 14 of the schools enrolled >20% English language learners. (The numbers do not include the students at Alamo Navajo Community School, since PED does not post statistics for schools run by the Bureau of Indian Education).

IV. Summer Research and Cohort Activities

The 28 Scholars of the 2024 cohort were matched with 21 faculty mentors from across campus (Appendix E). This represents a ~40% increase in the number of mentors versus 2023, and includes the new participation of faculty from the CoEHS (Exercise Science) and Medicine (Biochemistry). Relative to 2023, the number of A&S mentors increased from 6 to 10 and the number SoE mentors increased from 4 (all in Chemical and Biological Engineering) to 7 (including new mentors from Mechanical Engineering and Civil and Environmental Engineering). Seven mentors were women, unchanged from 2023.

The summer research session ran for 5 weeks from June 10 to July 12, one week longer than in 2023. Out-of-town Scholars moved into the UNM housing (de Vargas Hall) on the UNM campus on Sunday June 9. The first day (June 10) included program orientation, safety training and a welcome reception in the University Club; new Scholars also met their mentors in person. Beginning June 13, Scholars joined ongoing research projects which were their principal occupation for the duration of the session. Research projects ranged from the computational sciences (molecular modeling, evolutionary theory) to molecular synthesis, to organismal biology and ecology. Specific projects and Scholar/mentor pairings are given in Appendix E.

To encourage interactions among the Scholars and to broaden their exposure to UNM faculty and activities, Scholars were asked to attend a series of activities. These cohort activities included weekly coffee breaks (Tuesdays) and lunches (Fridays) to promote social interactions and informal exchanges of knowledge and an evening reception at the Maxwell Museum with fellows in the TODOS program (Noyes Scholars, science teachers from across NM). A more formal activity was scheduled each Friday afternoon:

a) a presentation on writing grant proposals by CoEHS professor and TODOS PI Deena Gould.

b) a presentation on the US Crystal growing competition, in several which Scholars have participated and Jeff Rack is an organizer (https://www.uscrystalgrowingcompetition.org/).

c) a presentation on student research projects from Scholar Leah Felty (V Sue Cleveland HS), who has attended the STEAM-H workshop led by Karen Kinsman and who has mentored a number of successful students in research challenge competitions.

d) a guided tour of the Museum of Southwestern Biology, a research museum with controlled public access, given by docent Breanna Kappel.

e) tours of faculty research labs and facilities to allow Scholars to see and hear about research outside of their own projects.

The summer session concluded Friday, July 12, with poster presentations by the Scholars on their summer research (poster titles in Appendix E). Posters were displayed in the atrium of the UNM Science and Math Learning Center; Scholars were encouraged to keep the posters afterwards for display in or near their classrooms. The session included a catered lunch and closing comments by the organizers and PED Math and Science Bureau Director Shafiq Chaudhary. The session was attended by ~60 UNM students and faculty in addition to the Scholars and organizers and also by NM Senator Harold Pope.

V. Ongoing connections with Scholars

Following the summer research session, we communicated with Scholars (2021 to 2024 cohorts) through periodic group emails and some induvial Zoom meetings and class visits. The emails typically centered on ROSE-related activities, but also mentioned other meetings and activities of organizations like the NMSTA and American Chemical Society. Readership as measured by opened emails was high (>80%), but responses were much lower (~10%). Scholars were encouraged to arrange class Zoom visits by UNM faculty and students.

VI. Funding

ROSE received support from several different sources and mechanisms in 2024, including direct payments to ROSE, payments to Scholars, and in-kind organizational support.

NM PED paid the 5-week stipends of 16 Scholars directly, $6,000 each for a total of $96,000. These payments from the PED Math and Science Bureau were requested and granted on a non-recurring basis and are not expected to be repeated in 2025.

The NSF CISTAR grant (lead UNM PI Abhaya Datye) paid the stipends for three Scholars who worked on CISTAR research (total $18,000). This grant also provided funding to bring the Scholars to UNM campus in October for a research meeting.

The Central Consolidated school district paid the stipend for one Scholar teaching in that district ($6,000; another Scholar from the same district was paid by NSF).

UNM operating funds for the 2024 summer session were obtained from the HED RPSP program Teacher Pipeline Initiative. For FY24 and FY25, $100K annually was allocated to ROSE. Because ROSE expenditures are centered on the June-July period, program expenses are more easily monitored on a CY (calendar year) basis, and a budget for CY 2024 is attached as Appendix I.

UNM expenditures for CY 2024 included $42K for Scholar stipends, $38K for on-campus housing and parking, $27K for graduate student "lab mentor" awards, $9K for salaries (staff coordinator and faculty stipend), and $7K for hospitality (space rental, catering). Miscellaneous expenses included lab safety equipment, poster printing, off-campus housing for CISTAR Scholars, conference participation and minor supplies. Total UNM expenditures in CY 2024 were $130K.

Total ROSE cost for CY 2024, combining UNM expenditures with PED, NSF CISTAR and district stipend support, was $250K not including in-kind contributions by UNM faculty and staff (especially before the hiring of Sarah Rascon coordinator in June). The overall per-Scholar cost of $9K is largely (~90%) direct costs for Scholar stipends, housing, and mentoring, with roughly 10% of the funds going to logistics, hospitality, etc.

Based on this $9K per Scholar cost, the HED RPSP funds supplemented by the $50K received from the OVPR for FY25 should allow a program size of 16-17 Scholars in summer 2025. This estimate is significantly lower than the 28 Scholars hosted in 2024, and it ignores fixed costs of administrative work and inflation in housing prices; a more realistic figure might be 12-13 Scholars. However, if additional funds can be obtained from federal sources (research grants) and/or from school districts, a larger Scholar cohort may be possible.

ROSE continues to pursue increased RPSP funding from the NM HED. For FY24, ROSE received $100K through RPSP categorical funds for teacher pipeline activities. UNM approved and requested expansion funds for FY25 ($366,833 in addition to the $100K in categorical funds for a total of $466,833 requested), but this was not approved by the legislature (RPSP FY25 application form and presentation slides included here in Appendix F. Another expansion request in the same amount was submitted in 2024 for FY26 and approved by UNM for inclusion in the request to the state. In December 2024, HED included a teacher pipeline amount of $275K for FY 2026 in their budget request to the NM legislature.

VII. Organization

The organizational proposal submitted last year to the OVPR was approved in Spring 2024. The ROSE program will report to Assistant VP for Research, currently Prof. Melissa Emery Thompson. Reports will continue to be distributed annually to the OVPR, the Provost's office and the relevant deans (A&S, SoE, CoEHS and CoP) as well as the NM PED Math and Science Bureau.

To lift some of the logistical and administrative burden from the CCB departmental staff, ROSE was allowed to hire a part-time program coordinator. Together with the NSF PREC grant overseen by Dr. Mark Walker, a 0.50 position (funded equally at 0.25 by ROSE and PREC) was

created and advertised in Spring 2024. Ten applications were received by April 1 and 4 candidates were interviewed in mid-April. An offer was extended to Sarah Rascon, who accepted the position and began on June 6. Specifics of the search process are summarized in Appendix H.

VIII. Assessment Process and outcomes

Program assessment consisted of a series of Scholar surveys and PI surveys during and after the summer session (summary report is attached as Appendix J). Results were summarized as:

1. The ROSE Scholars overwhelmingly had positive things to say about their experiences with ROSE and with their lab groups. They would come back again.
2. The PIs were overwhelmingly positive about hosting a ROSE scholar
3. For the majority of ROSE Scholars, reported little to moderate amounts of research experience prior to ROSE
4. The average ROSE Scholars has 14 years of experience teaching STEM, and has a degree in Education. Half of the Scholars reported a LEVEL II teaching license. All had at least one endorsement in science or math.
5. This experience has impacted their ability to address the practices of science and engineering standards, the activities in their classroom, and the amount of open ended inquiry with their students.

Surveys were written, conducted and summarized by Prof. Carolyn Hushman, Professor of Educational Psychology and Associate Dean for Research in the College of Education and Human Sciences. Scholars were asked to complete 4 surveys in Qualtrics- a welcome survey at the start of the summer session (31 completed), a mid-point survey two weeks later (30 completed), an endpoint survey in July (11 completed) and a final survey in December (10 completed).

Classroom teaching impact of the ROSE experience is significant. Scholars teach over 100 students a year, on average (3,679 total students were taught by this year's ROSE scholars). All of the Scholars responding in October reported that they changed the way they teach due to their ROSE experience, including new examples, new activities and the use of open-ended inquiry. Most teachers reported an increase in self-efficacy regarding teaching science concepts (69%) and practices (85%). One Scholar wrote "Doing research in a wet lab changed the way I include science practices in my class…no more graphic worksheets trying to mimic real science. and then to put into posters and presenting them is amazing and makes me more confident. I can't wait to host and make the STEM nights for families in school this year!"

The ROSE experience also changed how teachers see themselves. Survey responses showed 18% increase in agreement with the statement "I am part of the STEM workforce in New

Mexico". Most (87%) teachers agreed or strongly agreed that ROSE left them more motivated to teach science. One Scholar wrote that "I learned how scientists think, how to solve problems by thinking outside the box, and I learned/re learned why I love teaching science!"

Survey feedback on program logistics was helpful, and included information on recruiting, teacher motivation, and preparation for the summer. Teachers learn of the ROSE program from administrators, other teachers, and PED communications; they apply in order to improve their science knowledge and personally experience research. Most (75%) teachers felt they had enough information about logistics and stipends before the start of the summer program, but at the midpoint, 67% of teachers reported they were overwhelmed by the research and equipment in their lab (this decreased to 24% at the end of the session). Some teachers specifically requested more advance information housing and parking.

Finally, ROSE is changing how Scholars interact with their students. One Scholar wrote that "It was hard to be the learner and not the leader! The graduate student I worked with was fabulous, and listening to him made me remember how important it is to break complex ideas down clearly for a learner. I also appreciated feeling inadequate at the beginning as many students do when they start chemistry." Another concluded that "I now have a better understanding of the research being done at UNM and can 'sell' the idea for those students who are not sure why STEM is a good way forward."

For the PI Survey, 13 PIs completed the initial survey, five completed the end of program survey. PIs were overwhelmingly looking forward to hosting a teacher in their lab, and expressed being nervous about the short amount of time or not being helpful to the teacher. At the end of the experience, survey results showed an overwhelmingly positive experience for both the lab group and the PI. Teachers contributed to the research by being good communicators and detailed oriented. It was suggested these surveys should go to the individuals in the groups directly working with the teachers and not the faculty PI.

Acknowledgements- ROSE organizers gratefully acknowledge support from the New Mexico Public Education Department (PED), the NM Higher Education Department (HED), the National Science Foundation (NSF) and the University of New Mexico (UNM).

Appendix A. ROSE program advertising
A1. Text for NM STEM Connect, October 2023

ROSE: Research Experiences for Science Educators

Middle and high school science teachers- are you interested in learning more about what scientists do and what tools and skills they use in their research? ROSE brings science teachers into UNM research groups for a month in the summer to join ongoing research projects.

In summer of 2023, UNM hosted 22 Scholars from schools across New Mexico, including Lovington, Laguna Pueblo, Shiprock, Raton, Ruidoso, Santa Fe and Las Cruces. Their research was conducted on projects lead by faculty PIs from Chemistry and Chemical Biology, Biology, Earth and Planetary Science, and Chemical and Biological Engineering. We plan to host a similar group of projects in the summer of 2024.

The program is funded by PED and UNM, and provides a stipend, on-campus housing for teachers from outside Albuquerque, and opportunities to meet and work with UNM faculty, staff, and students. More information is available on the website:

https://UNMROSE.unm.edu

We anticipate the 2024 session will begin the second week of June and run for 5 weeks; best consideration date for applications will be late February/early March. Exact dates for the summer and for application process will be posted on the website on January 15, 2024. If you have questions, please email one of these UNM faculty helping to organize the program:

Steve Cabaniss, Prof. Chemistry and Chemical Biology cabaniss@unm.edu)
Jeff Rack, Prof. Chemistry and Chemical Biology jrack@unm.edu)
Carolyn Hushman, Prof. Educational Psychology ckimble@unm.edu

A2. Text for NM STEM Connect sent Jan. 15, 2024

Research Opportunities for Science Educators (ROSE 2024)

Are you interested in performing cutting-edge research in state-of-the-art facilities? Would you like to learn the latest in the development of scientific theories? Would you like to know more about research opportunities at the University of New Mexico? UNM has partnered with the NM PED to create a program designed to bring science teachers to UNM for an intensive five-week program working in an existing research group (Monday, June 10 to Friday, July 12). Participants of the program will receive a stipend of $1,200 per week for five weeks. Housing will be provided on-campus for those that do not have local housing. All participants will receive a UNM parking pass and access to the library and other institutional buildings.

Applying is easy! We only need your name, your school, email address, and short answers to a few simple questions:

ROSE Summer 2024 Online Application

To learn more about individual research opportunities, please see the list of abstracts at our website (www.unmrose.unm.edu). This opportunity will allow you to participate in an active research project that seeks to answer important discipline-specific scientific questions. Prior experience in research is **not** a requirement to participate in this program. We continue to expand the program, and previous applicants and ROSE Scholars are invited to apply in 2024. Research topics include Chemical Synthesis, Bioengineering, Nanochemistry and Nanoscience, Molecular Modeling and Computation, Energy Science, Photochemistry, Electrochemistry, Biochemistry, Drug Design, Materials Science, and many others. We look forward to receiving your application.

Please direct questions to unmrose@unm.edu. Full consideration will be given to applications received by **March 1, 2024**. We plan to send notifications to accepted scholars as early as **March 8, 2024**, and this will continue until the cohort is complete.

A3. Advertisement for the NMSTA website sent Jan 17, 2024 (also sent to Scholars)

Research Opportunities for Science Educators (ROSE 2024)

Are you interested in performing cutting-edge research in state-of-the-art facilities? Would you like to learn the latest in the development of scientific theories? Would you like to know more about research opportunities at the University of New Mexico? UNM has partnered with the NM PED to create a program (https://UNMROSE.unm.edu) designed to bring science teachers to UNM for an intensive five-week program working in an existing research group (Monday, June 10 to Friday, July 12). Participants of the program will receive a stipend of $1,200 per week for five weeks. Housing will be provided on-campus for those that do not have local housing. All participants will receive a UNM parking pass and access to the library and other institutional buildings.

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To learn more about individual research opportunities, please see the list of abstracts at our website (www.unmrose.unm.edu). This opportunity will allow you to participate in an active research project that seeks to answer important discipline-specific scientific questions. Prior experience in research is **not** a requirement to participate in this program. We continue to expand the program, and previous applicants and ROSE Scholars are invited to apply in 2024. Research topics include Chemical Synthesis, Bioengineering, Nanochemistry and Nanoscience, Molecular Modeling and Computation, Energy Science, Photochemistry, Electrochemistry, Biochemistry, Drug Design, Materials Science, and many others. We look forward to receiving your application.

Please direct questions to unmrose@unm.edu. Full consideration will be given to applications received by **March 1, 2024**. We plan to send notifications to accepted scholars as early as **March 8, 2024**, and this will continue until the cohort is complete.

A4. Emails sent to New Mexico school district superintendents Jan. 15, 2024

Dear Colleagues in education,

I am writing on behalf of ROSE, a STEM professional development summer program at UNM run in partnership with NM PED.

ROSE (Research Opportunities for Science Educators) provides an intensive, on-campus research experience for in-service science teachers (ROSE Scholars). Information about the program and online application procedures (best consideration date March 1, 2024) can be found in the attached document and at our website:

https://unmrose.unm.edu/

ROSE began in 2021 and has brought ~40 teachers to conduct research at UNM over 3 summers. The summer 2024 session is being announced via PED's STEM Connect bulletin and NMSTA, but Scholars have suggested that reaching out directly to superintendents helps reach a wider audience.

Please pass this information on to middle and high school science teachers who might benefit from a 'hands-on' research experience. We are particularly interested in reaching teachers who may not be 'plugged in' to professional development networks (although they must have taught for at least one year, and two or three would be preferable). No research experience or science degree is required or expected- most Scholars have degrees in education. Scholar selection emphasizes outreach to schools with high URM enrollment and geographic diversity across the state. In summer 2023 we hosted 22 teachers from across New Mexico, ¾ of whom taught outside the Albuquerque metro area.

ROSE provides a stipend and on-campus housing.

We are excited about bringing teachers into a research environment where they can experience 'what scientists do'. We appreciate your help in reaching out to teachers who can benefit from this program.

Thanks,

Steve

A5. Mentor Recruitment

ROSE: **R**esearch **O**pportunities for **S**cience **E**ducators

Faculty Mentors Wanted for Summer Research

The ROSE program (https://UNMROSE.unm.edu) is looking for new faculty PI mentors for the Summer research session which will run for 5 weeks in June-July 2024. ROSE Scholars are secondary and middle school science teachers from around the state who are excited about engaging in state-of-the-art research and bringing new knowledge and enthusiasm back to their schools and students. They are provided with a weekly stipend and if requested, housing on the UNM campus. In return for the investment of your group's time and resources, mentors have the opportunity to help improve New Mexico science education, build personal connections to schools, and add a significant item to the broader impact sections of your research proposals. ROSE encourages ongoing connections with Scholars, including academic year interactions and research continuation (Scholars may be funded for up to three years).

Scholars interact regularly with their mentors and with members of their research groups, learning specific skills and subject matter, but more importantly how we "do research"- something not typically included in teacher training courses. Scholars can join an ongoing project or be given a small project of their own. Previous Research projects are described on the website, which also provides the names and school affiliations of the Scholars. We expect to have funds to provide bonus stipends ($1000 each last year) to graduate students who spend significant time providing hands-on assistance in mentoring a Scholar. The Scholars also participate in several cohort activities (some purely social, but also workshops and panel discussions) to which mentors are invited. Going forward we hope that the summer relationship will lead to ongoing communications between UNM, mentors, and Scholars.

Scholars apply and are selected during the Spring based on the student URM percentages in their schools, the geographic diversity of the communities served, and their own teaching record/plans; they are not being selected because they have outstanding science backgrounds or prior research experience, although a few of them do. In general you should expect that the Scholars will bring a new perspective to your lab, but may need help with skill-building (especially if this is their first time participating in the ROSE program.) If you have an ongoing NSF grant and can obtain an RET supplement, we would work with you to ensure your Scholar was qualified for your project.

Expectations for mentors- Each mentor should provide a brief research description (text and image) for posting on the website by the end of the Fall semester. If you have specific preferences for Scholars working in your lab, please tell us early in the Spring semester. Once Scholars have been matched, you should send a welcome email in early May to provide contact and project information and perhaps arrange a (probably virtual) meeting before the summer session. The most important expectation is that you will provide a supportive and intellectually stimulating research environment for your Scholar(s) and spend some one-on-one time with them during the summer session.

Draft version 9/15/2023 SEC

Appendix B. ROSE 2024 Timeline

October 2023	Initial Announcement in STEM Connect
Jan. 15	Statewide publicity begins (STEM Connect, NMSTA)
Jan. 15	Online application goes live
March 1	Best consideration date for applying for Summer 2024
March 15	Offers sent by email to accepted applicants
March 29	Scholar decisions (accept/decline) due to ROSE
April 5	Second round of acceptances, if needed
April 19	Second round of Scholar decisions due to ROSE
April 26	Scholar/Mentor matching decisions announced
June 9	Dormitory Move-in and Welcome reception in SUB
June 10	Session begins with Scholar orientation

Appendix D. Summer 2024- 28 Accepted ROSE Scholars with School Demographics

First name	Last name	Name of School	School city	Enrolled	Hispanic	Indigenous	Black	Asian	Caucasian	EconChal	ELL
Utahna	Denetclaw	Tse Bit Ai Middle School	Shiprock, NM	513	1	96	1	1	1	99	34
Alexis	Maranan	Alamo Navajo Community School	Alamo								
Leah	Felty	V Sue Cleveland High School	Rio Rancho	2470	55	5	3	2	31	30	2
Adrienne	Vigil	Santa Fe High School	Santa Fe	1599	74	3	2	2	19	31	18
Erley	Tangalin	Bernalillo High school	Bernalillo	833	51	42	1	1	7	99	20
MAAN	TEMBREV	CHIEF MANUELITO MIDDLE SCHO	GALLUP	602	13	82	1	1	3	99	26
Chrysler	Martinez	Chief Manuelito Middle School	Gallup	602	13	82	1	1	3	99	26
Venetia	Phillippe	Santo Domingo School	Santo Domingo, N	94		100				70	41
Janelle	Amador	Gordon Bernell Charter School - MDC	Albuquerque	140	57	20	8		14	39	18
Tyza Faith A	Iwag	Raton High School	Raton	397	66	2	1	1	31	99	3
Anelisia	Pena	Peñasco High School	Peñasco	165	83	12	3	3	5	96	5
Aubri	Workman	Vista Nueva High School	Aztec	70	40	5	5	5	56	95	5
Violet	Hobbs	Lovington High School	Lovington	737	80				18		19
William	Kennedy	Valencia Middle School	Los Lunas	492	69	4			27	39	23
Derek	Martinez	Los Lunas High School	Los Lunas	1486	69	9			21	33	9
Amber	Quintana	McCurdy Charter School	Espanola	540	92	4			3	34	14
Florence	Fiegalan	Kirtland Central High School	Kirtland	713	9	82			8	29	46
Margaret	Lewis	Robertson High School	Las Vegas	402	91				7	37	12
Stacey	Eberhart	Roswell High School	Roswell	1438	82		2		14	41	13
Misti	Shultz	Gallup High	Gallup	961	18	74	1		6	53	31
Juliet	Tandoy	Zuni Middle School	Zuni	244	1	98	0	1	1	86	43
Arturo	Herrera	Capitan High School	Capitan	145	32				62	30	
MARIBEL	BERNAL	Gadsden Middle School	Anthony	661	98					55	48
Cris Anthon	Rabino	Zuni High School	Zuni	274	2	98	2	2	2	98	43
Ana Rosa	Carmona	Zuni Middle School	Zuni	244	1	98	0	1	1	86	43
Juliet Mae	Dumepnas	Shiprock High School	Shiprock	582	3	96				55	36
Naomi	Vijeila	Solare Collegiate Charter School	Albuquerque	259	92		4			47	33
Cynthia	Dumayas	Tse Bit Ai Middle School	Shiprock	513	1	96	1	1	1	99	34

Appendix E. Scholars, Mentors and Poster Titles

First name	Last name	Adviser	Project
Utahna	Denetclaw	Garzon	*"3D Imaging at Micron Levels"*
Alexis	Maranan	El Hayek	*"Identification of Microplastics in Beans and Rice using Pyrolysis Gas Chromatography Mass Spectrometry"*
Leah	Felty	Chen	*"Li-ion Batteries: A Study of Cation-Disordered Mn and Fe Cathodes"*
Adrienne	Vigil	Walker	*"Cloning of the Plusbacin Biosynthetic Gene Cluster"*
Erley	Tangalin	Chen	*"Comprehensive Characterization of Cathode material for Na ion Batteries"*
MAAN	TEMBREVILLA	Noureddine	*"Targeted Drug Delivery Using Mesoporous Silica nanoparticles: A Study On Cancer Treatment Efficacy"*
Chrysler	Martinez	Salinas	*"Hearing danger: NFkB expression around teleost neuromast-associated hair cells as a potential indicator of a no*
Venetia	Phillippe	Rudgers	*"Biocrust Sensitivity Across Different Dry Land Habitats & Tying it with the Bee Community"*
Janelle	Amador	Chi	*"Oligomeric p-phenylene ethylene as Liquid-liquid Phase Separation Sensor"*
Tyza Faith Arel	Iwag	Chi	*"Oligomeric p-phenylene ethylene as Liquid-liquid Phase Separation Sensor"*
Anelisia	Pena	Garver	*"Natural History and Biochemical Genetics of Niemann-Pick C1 Disease in New Mexico"*
Aubri	Workman	Rack	*"MCD and MCPL of Metalloporphyrins"*
Violet	Hobbs	Datye	*"High Entropy Alloy Catalysis for Improved Stability of Propane Dehydration"*
William	Kennedy	Brinker	*"Solar Heating of an Endothermic Ethylene Reactor"*
Derek	Martinez	Noureddine	*"Targeted Drug Delivery Using Mesoporous Silica nanoparticles: A Study On Cancer Treatment Efficacy"*
Amber	Quintana	Amorin	*"The effects of caffeine on thermoregulation and acute kidney injury during simulated construction work"*
Florence	Fiegalan	Kumar	*"Microstructure and Hardness of 3D Printed Inconel 718 using Direct Energy Deposition"*
Margaret	Lewis	Olivier	*"Optimizing the Encapsulation and Release of Hydrophobic Drugs in Biocompatible Hydrogels on Microwires"*
Stacey	Eberhart	Aronoff	*"Biomanufacturing and Producing Cost-Effective Gamma-carboxyglutamic acid (Gla)"*
Misti	Shultz	Choe	*"Evaluating the Binding Affinity of a Novel Drug to p53: A Step Towards Targeted Cancer Therapy"*
Juliet	Tandoy	Feng/Ting	*"Enhance MALDI Imaging MS Analysis of Lipids in Mouse Brain Through Tissue Washing"*
Arturo	Herrera	Kumar	*"Microstructure and Oxidation Properties of Novel Refractory High Entropy Alloys for Aerospace Applications"*
MARIBEL	BERNAL	Mulchandi	*"Can we get water out of thin air using AWH? (Atmospheric Water Harvesting)"*
Cris Anthony	Rabino	El-Hayek	*"Identification of Microplastics in Beans and Rice using Pyrolysis Gas Chromatography Mass Spectrometry"*
Ana Rosa	Carmona	Xiang	*"Targeting Iron-Dependent Nucleotide Synthesis Enzymes for Colorectal Cancer Therapy"*
Juliet Mae	Dumepnas	Davorka	*"Evolution of Storage effect in changing environments"*
Naomi	Vijeila	Rudgers	*Sevilleta Long-Term Ecological Research (Sevilleta EDGE, Plant Models, and Biocrust pH)"*
Cynthia	Dumayas	Garver	*"Natural History and Biochemical Genetics of Niemann-Pick C1 Disease in New Mexico and Nova Scotia"*

Appendix F. CY 2024 Budget

Appendix G. RPSP application and slide presentations

Appendix H. Selection for PREC/ROSE program coordinator Requisition 28546:

Selection Committee-

Steve Cabaniss, Professor, CCB (ROSE organizer)
Jeff Rack, Professor, CCB (ROSE organizer)
Cheri Vogel, TODOS program coordinator, CoEHS
Mark Walker, Professor CCB (PREC PI)

We received ten applications as of April 1. Seven of these were plausible, and the applicants were asked to confirm interest in a 0.5 FTE. We Zoom-interviewed the 4 applicants who responded affirmatively using the same set of questions (found in the interview notes):

Juanita Martinez	April 12	Notes by Rack
Rob Lopez	April 12	Notes by Rack
Scott Willie	April 15	Notes by Cabaniss
Sarah Rascon	April 16	Notes by Cabaniss

Following the interview with Rascon, the committee discussed and compared all four interviewed applicants:

Martinez had the longest and most appropriate experience in communications, management, and purchasing; she also has extensive experience in science (PhD Chemistry, lab manager). She was the unanimous top choice, although her expressed preference is for a full-time position in web design.

Lopez had the least experience in communications and administrative work. Three of the four committee members thought he was not acceptable (Walker thinks he could be trained).

Willie is enthusiastic and particularly interested in in-person communications and outreach to minority communities; he has had previous positions working with minority science students in research labs at Univ. Utah. He expressed a lack of interest in impersonal work and showed a lack of attention to detail in both the application and the interview.

Rascon is specifically interested in a part-time position and has previous experience in teaching and legal office administration. As a former full-time and substitute teacher she would bring connections to that community.

Based on the above interview and conversations and recognizing that the position, although not sharply defined, will require considerable remote communication and organization, the applicants were ranked 1. Martinez, 2. Rascon, 3. Willie, and 4/unacceptable- Lopez.

Jeff Rack contacted Dr. Martinez to ask for references, and she withdrew her application since she had taken another position.

Steve Cabaniss contacted Sarah Rascon and obtained three references (in addition to Amanda Mink, whom she knows personally). SC interviewed the references over the telephone using the HR question rubric during the period April 22-April 24. All references were extremely positive, and so Ms. Rascon should be offered the position.

Appendix I. Account statement for Index 885528

FOROLDS

Operating Ledger Summary
Through the Month of January 2025

01/14/25

Index: 885528 - 07XX UNM ROSE
Includes Contra-Accounts.

Account Description	Budget (FYTD) Adopted	Budget (FYTD) Adjustments	Budget (FYTD) Accumulated	Actuals Current Month	Actuals Pct	Actuals Fiscal YTD	Actuals Pct	Encumbrances	Balance Available	Balance Pct
Revenue										
0720 - State Appropriations Gen	$100,000.00	$.00	$100,000.00	$8,333.00	8.33%	$58,335.00	58.34%	$.00	$41,665.00	41.67%
1900 - Reserves	$.00	$.00	$.00	$.00	.00%	$90,759.59	.00%	$.00	($90,759.59)	.00%
1901 - Budgeted Use of Reserves	$.00	$35,000.00	$35,000.00	$.00	.00%	$.00	.00%	$.00	$35,000.00	100.00%
*Total Revenue	$100,000.00	$35,000.00	$135,000.00	$8,333.00	6.17%	$149,094.59	110.44%	$.00	($14,094.59)	(10.44%)
Expense										
2005 - Summer Administration	$.00	$.00	$.00	$.00	.00%	$5,000.00	.00%	$.00	($5,000.00)	.00%
2060 - Support Staff Salary Detail Gen	$.00	$.00	$.00	$84.60	.00%	$1,615.35	.00%	$5,541.30	($7,156.65)	.00%
2110 - Fica Gen	$.00	$.00	$.00	$6.46	.00%	$506.06	.00%	$.00	($506.06)	.00%
2140 - Retirement Gen	$.00	$.00	$.00	$15.35	.00%	$1,200.68	.00%	$.00	($1,200.68)	.00%
2180 - Unemployment Compensation Gen	$.00	$.00	$.00	$.04	.00%	$3.30	.00%	$.00	($3.30)	.00%
21A0 - Workers Compensation Gen	$.00	$.00	$.00	$.09	.00%	$9.60	.00%	$.00	($9.60)	.00%
2100 - Other Staff Benefits Gen	$.00	$.00	$.00	$3.04	.00%	$58.17	.00%	$.00	($58.17)	.00%
3100 - Office Supplies General	$.00	$.00	$.00	$.00	.00%	$1,384.32	.00%	$.00	($1,384.32)	.00%
3140 - Business Food - Local	$.00	$.00	$.00	$.00	.00%	$2,283.31	.00%	$.00	($2,283.31)	.00%
3921 - Travel Non UNM Emp-Non Foreign Natl	$.00	$.00	$.00	$.00	.00%	$684.50	.00%	$.00	($684.50)	.00%
4020 - Student Awards Gen	$.00	$.00	$.00	$.00	.00%	$26,550.00	.00%	$.00	($26,550.00)	.00%
4080 - Student Travel Gen	$.00	$35,000.00	$35,000.00	$.00	.00%	$34,866.30	99.62%	$.00	$133.70	.38%
4660 - Participant Support Gen	$.00	$.00	$.00	$.00	.00%	$42,000.00	.00%	$.00	($42,000.00)	.00%
46A0 - Participant Misc Gen	$.00	$.00	$.00	$.00	.00%	$1,069.53	.00%	$.00	($1,069.53)	.00%
6340 - Conference Fees Gen	$.00	$.00	$.00	$.00	.00%	$100.00	.00%	$.00	($100.00)	.00%
63C0 - Copying Gen	$.00	$.00	$.00	$.00	.00%	$1,369.00	.00%	$.00	($1,369.00)	.00%
8060 - Other Operating Costs Gen	$100,000.00	$.00	$100,000.00	$.00	.00%	$.00	.00%	$.00	$100,000.00	100.00%

FOROLDS

Operating Ledger Summary
Through the Month of January 2025

01/14/25

Index: 889528 - 07XX UNM ROSE
Includes Contra-Accounts.

Account Description	Budget (FYTD) Adopted	Budget (FYTD) Adjustments	Budget (FYTD) Accumulated	Actuals Current Month	Actuals Pct	Actuals Fiscal YTD	Actuals Pct	Encumbrances	Balance Available	Balance Pct
80K0 - Banner Tax	$.00	$.00	$.00	$.00	.00%	$488.91	.00%	$.00	($488.91)	.00%
80K2 - Foundation Surcharge	$.00	$.00	$.00	$.00	.00%	$592.95	.00%	$.00	($592.95)	.00%
'Total Expense	$100,000.00	$35,000.00	$135,000.00	$109.58	.08%	$119,781.98	88.73%	$5,541.30	$9,676.72	7.17%
Report Total Revenue:	$100,000.00	$35,000.00	$135,000.00	$8,333.00	6.17%	$149,094.59	110.44%	$.00	($14,094.59)	(10.44%)
Report Total Expense:	$100,000.00	$35,000.00	$135,000.00	$109.58	.08%	$119,781.98	88.73%	$5,541.30	$9,676.72	7.17%
Report Net:	$.00	$.00	$.00	$8,223.42	.00%	$29,312.61	.00%	($5,541.30)	$23,771.31	.00%

Parameters:
Index: 889528 - 07XX UNM ROSE
Includes Contra-Accounts.

Appendix J. Survey Assessment Report

All participants were asked to create a unique number to them, so that responses could be matched across the surveys. If responses could not be matched, their results are included in each individual section, but not in the combined experience sections. Surveying was done with the ROSE scholar and the PI. All surveys were sent to participants provided emails and were administered with Qualtrics.

ROSE Scholar Survey

ROSE Welcome Survey: The welcome survey had 37 open (7) and closed (30) ended items. It focused on logistics and clerical matters, measuring aspects of identity, prior experiences, demographics, and current classroom environment. Participants completed the survey in the first three days with 100% completion.

ROSE Mid-point Survey: This survey had five questions-3 closed questions and 2 open-ended. The questions focused on satisfaction with experience, concerns, and how they thought this would impact their classrooms. It was sent at the start of the third week and had 31 completions.

Rose End-point Survey: This survey had 20 items with 12 of them being closed ended and 8 being open ended. The questions focused on logistics and clerical matters, thoughts on classroom impact. It was sent the last day of the program, followed by two email reminders at 2 and 3 weeks after the experience. There were 11 respondents.

ROSE Final Survey: This survey had 25 questions with 15 closed items and 10 open questions. It focused on aspects of identity and changes made to their classroom practices. It was sent the first week in November (3 months after experience) with two email reminders at 2 and 3 weeks. There were 10 respondents.

The scholars:
This year the scholars had:

Level of license:
Alternative/emergency: 5
Level 1: 4
Level 2: 15
Level 3: 7

Endorsement:
Science: 28
Math: 5
Health/PE: 6
Coaching: 4
TESOL/Bilingual: 4
Psychology: 4

Years Teaching:
0-5 years: 7
6-10 years: 10
11-15 years: 8
16+ years: 7

Logistics and Clerical Matters

- Teachers learn about this program from administrators (33%), other teachers (30%), and PED communications (28%)
- The reasons for applying are mostly (47%) to improve their science knowledge followed closely by the desire to experience research (48%)
    - "It has been a very long time since I had professional development on the knowledge of science and not just pedagogy of teaching science"
    - "I have actually never been in a research lab and avoid any true lab experiences in my classroom because I am not confident in what I am doing."
    - "We spend a lot of time thinking about how to better serve students that we don't get to spend time keeping up to date with science knowledge."
- 83% of teachers felt they had enough information about logistics and stipends before the start of the program.
- At the midpoint, 55% of teachers reported they were overwhelmed by the research and equipment in their lab, at the end 30% reported the same feeling.

Helpful:

- "Timing was good as I got my letter just as I was finalizing my summer plans."
- "This was helpful in getting me thinking about my professional learning plan for the next year when I saw the announcement."
- "Everyone is soooo helpful in answering questions, even when I ask 1000 of them because I am so nervous."
- "It could be organized better. The networking opportunities between teachers could be improved. These surveys could be better constructed. Having a one-on-one debrief for the teachers with program coordinators would be helpful."

Suggestions:

- It would be nice to have more details up front. Information about how and when the stipend gets paid would have been nice to have, especially since many people came in from outside of ABQ.
- Info on the dorm-style housing, or a basic outline of expectations for the program would be helpful too.
- Description/summary of projects available.
- Have more time spent doing the research and skip the safety trainings.
- Parking is a bit confusing, and the dining was too expensive.
- Having more explicit maps about dining locations on campus and other interesting items on campus (10 participants mentioned how beautiful campus is in the summer)
- The new PI's didn't seem to have an understanding of the program or they thought of us as just another grad student. I didn't actually do any research. (There were four people

who answered something similar about 'observing the equipment but not allowed to touch anything' or 'watching the grad students do research' in the final survey)
- Timing-five individuals said it was too long and five individuals said it was too short
- 4 respondents suggested spending time on Friday talking about how teachers are looking at the impacts of this experience on their classrooms
- 10 respondents mentioned the Friday activities-8 mentioning getting to know more about UNM scientists, labs being the best part of Friday.

Experiences:
- 98% of teachers report having little to no prior research experience
- 64% of teachers report their teaching spaces/schools are not safe for the use of chemicals
- 70% of teachers report they have never received training in how to safely handle hazardous chemicals
- 83% of teachers report not using chemicals in their classroom (60% reported due to lack of safe space in school)
- 21% of teachers report a science fair or research challenge at their school
- 62% report have clubs geared towards STEM at their school
- 0% of teachers report having training in safety including handling equipment or chemicals in last 5 years
- On average, teachers in ROSE have been teaching for 14 years (range 1-30 years)
- 80% of teachers report a degree (BS or MA) in education, 10% report a degree in science or engineering (BS)
- 92% of teachers agree or strongly agree with the statement "The ROSE program is high quality professional development
- "I wanted to improve my skills and knowledge of science to improve my teaching. I feel it is important to grow as a teacher. Working in a lab and experiencing advanced science concepts and methods I improved so much and the way I approach hands on activities in class has completely changed. This is the best professional learning opportunity the state has ever offered."

Identity Impacts
- 37% increase in agreement with the statement "I am part of the STEM workforce in New Mexico" from individuals who completed all surveys
- 87% of teachers agreed or strongly agreed that ROSE left them more motivated to teach science
- 30% increase in agreement with the statement "Science is the best discipline to teach." From individuals who completed all surveys
- "I walked into the summer burned and questioning my life choices. I left ROSE excited for the upcoming year and teaching high school science. The people and experience is great. Thank you!"

Classroom Impacts:
- On average, teachers teach 131 students a year.
- At the mid-point survey, 62% teachers mentioned they hadn't thought about the impact on their classroom until the survey actually asked them to.

- 50% of teachers report an increase in self-efficacy regarding teaching science concepts
- 67% of teachers report an increase in self-efficacy regarding teaching the practices of science and engineering
- 51% increase in teachers intending to support student projects focused on growing skills in the practices of science and engineering
- 32% increase in agreement with this statement, "research is an important part of teaching science." For those who completed all three surveys
- 38% increase in teachers who report incorporating the practices of science and engineering in their lessons for those who completed all three surveys
- 100% of teachers report they have changed the way they teach due to their ROSE experience
    - Class activities (50%)
    - Examples in class (74%)
    - Feedback to students on their learning (34%)
    - Incorporating open ended inquiry projects/assignments (41%)
- "This program for me is a life changing opportunity for me. I was really blessed to be part of this program coz I was not only grown professionally but as well as personally. My students will spend more time doing science and not just listening to me talk about science."
- "Teaching my students more about ecology and what impacts it can have in our state. Starting their own research project to carry over for several years. We can have realistic critical thinking conversation from pictures that I have taken of my experience at UNM.
- "We will be focusing on skills as much or more so than just the facts in my classroom. Science, as I realized, is a dynamic process and not a textbook."
- "Labs are an important part of understanding science content. The experience I had reaffirms my belief that hands on labs paired with reading is essential to explaining variables and the unknown. I'm my class I can develop lessons by testing for bacteria in our water system. Water seems to be an issue for many families in the communities I serve. It would be interesting to see the impact drinking water for human consumption from wells that is also used for livestock fares when it comes to bacteria. It is an issue I want to address with my students have them complete a project in this."
- "I will be able to discuss academic and career options with my students, and show them what research looks like in a college setting.
- "I hung my poster in my classroom and students, parents and other teachers ask me about it all of the time."

OTHER:

- "My experience wasn't all negative. There are so many positives that came out of of what I learned. I spent hours reading up on the research I was given, and I coud understand it!. I helped other teachers in their research by going to the lab early and getting in on what they were doing. I found other ways to be productive until I had to report to my lab. I helped a teacher with an experiment she was preparing for her school. I took pictures for other teachers in their lab. I talked with other students about our research in which they were collaborators too. I made my situation better and got more than what I was upset about. I look back now and think that may be how they conduct research. It takes time for cell cultures and when they test it it takes 16 hours to move on in their work. Perhaps I

could have been open to this if I was told and it was communicated to me from the beginning. As I stated before, I'm grateful I stuck it out and it ended up meeting my expectation in the end."

- "while I loved my experience, what I did was so far over my kids heads and I am not even sure how it will impact my teaching. But that isn't to say that this was a great experience and reminded me why I love science teaching."
- "I wish I got to do more than just observe the graduate students doing everything. I did get excited at the poster presentation and seeing what an amazing experience everyone else had and meeting folks was great."

PI Survey

PI Survey-Start: This survey had 19 items with 6 open questions and 13 closed items. It focused on expectations of working with the ROSE scholar and impact on research environment. It was sent the first week in June. There were 13 responses.

PI Survey-End: This survey had 15 items with 6 open questions and 9 closed items. It focused on experiences of working with the ROSE scholar and impact on research environment. It was sent the first week in July with one follow up. There were 5 responses, two of which could be matched to their earlier survey.

Rank:
2 Professors
4 Associate Professors
6 Assistant Professors
1 Research Professors

Years at UNM:
0-5 years: 7
6-10 years: 4
10+ years: 2

Experience working with K-12 teachers:
No experience: 6
Experience: 7

Logistics: Two PIs reported feeling they needed more information about ROSE and/or that they still had questions before the program started.

How they learned about the program:
Colleague: 8
Steve/Jeff: 3
ADR: 1

Why they participated:
Boarder impacts on funding: 2

Ability to support K-12 science: 11

- "I was interested in the novel kind of community engagement it provided and believed in the long term vision of providing some benefit to the next generation of undergraduates and future scientists."
- "Teachers are a way to impact a large number of K12 students. Each teacher interacts with 100+ students per year, much greater reach than we could have individually"
- "To help my broader impacts for NSF funding and get experience for my grad students to engage in mentoring"

Confidence in working with K-12 educators: 100% agreed or strongly agreed with statements regarding confidence in working with teachers.

- "I have worked with RET teachers in the past as a graduate student. I'm excited to be a part of this program now as a faculty mentor"
- "I agree, but don't feel overwhelmingly confident about any aspects of what will happen this summer."

While 100% of respondents looked forward to working with teachers, 88% do not feel connected to the science education community outside of UNM.

- "I don't feel particularly connected to the K12 community in New Mexico. I hope this program will lead to those connections"

In regards to what PIs were most interested in learning from their ROSE scholar:

a) 13 responses mentioned learning about K-12 science education in New Mexico
b) 7 responses mentioned curiosity in how the experiment/new knowledge will be incorporated into the K-12 teacher's classroom
c) 4 responses discussed how teachers are preparing students for post-secondary or recruiting students to UNM

"How they prepare their students for university and what resources are available to their students."
"What they and their students are interested in regarding science and how experience in a research lab can benefit their teaching."

All respondents expressed ways the ROSE scholar could impact their research groups:

- "Offer a different perspective on science research and to connect with the k-12 teaching community."
- "I believe that my students will see how teachers think about science. They have forgotten about HS and do not realize how little they knew back then."
- "My group is very excited about the opportunity. We will learn more about science education in NM and get to connected to community, but my student will get an opportunity to mentor a science teacher and learn through mentoring."
- "Having worked with the two teachers last summer, I'm looking forward to the energy and excitement they will bring to my lab. They are experienced and detail oriented and I think these qualities will have a positive impact on my students."

- "I think the experience will help us to better communicate our research and also learn about how science is taught at the high school level."

In regard to what the PI was most nervous about regarding hosting a ROSE scholar

- "I am afraid of taking some of my knowledge for granted and failing to give a solid background - this is why I am also assigning a grad student who is a fantastic TA as a secondary mentor."
- "The amount of time available is rather short, especially considering that they will also need to take lab safety training. Hopefully they will learn something and benefit in that process"
- "Whether the project will work. The project is based on a lot of background information. It will be a lot of work to catch up on the background."
- "The time is so short, what if they don't learn something or have a terrible time."
- "Feeling unprepared for communicating our research at an appropriate level to connect with the teacher."

After the experience, 100% of respondents indicated feeling strongly connected to the science education community outside of UNM.

Things the PIs report learning from their teachers:

- That there are dual language and ESL schools in the state
- Science classes do not have as much lab experience associated with them as they use to due to equipment costs and safety concerns
- Struggles with math start well before university for many NM students

Things the ROSE scholars contributed to their lab groups:

- Excitement and energy
- Good sense of flexibility and being able to modify when needed
- Excellent communication and questioning skills ("it was great watching the ROSE scholar really grilling my graduate students and asking 'why'.")

100% of respondents at the end suggested that these surveys should really go to the lab groups/students who worked with the ROSE scholar and not the PI.