

Intentional Research Team Building

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Many contemporary research challenges are associated with a level of complexity that requires solutions toward them to be developed by teams of scholars bringing relevant experience, innovative techniques, and interdisciplinary perspectives. As a result, over the last two decades, the scientific community has begun to pay considerable attention to team science as a method to enable advances not possible by a single laboratory or group.¹ Team science is now known to accelerate scientific and technological innovation and serve as an effective vehicle through which to translate research and scholarship into practice and policy.² More recently, team science scholars documented that the outputs of diverse research teams tend to be more novel and highly cited.³ Because the fundamentals of team science and leadership are transferrable, and given the demonstrated affordances associated with inclusive team leadership, institutions are beginning to explore how they might best support faculty interested in obtaining the skills and experiences needed to lead large, collaborative, and diverse research teams.

The University of Nebraska-Lincoln (UNL) is taking an intentional approach toward research team building. It is focused on team formation and starts at the very beginning of the process by supporting the professional growth and development of research team leaders. This approach is distinctive because academic leadership programs focused on preparing departmental executive officers, deans, and provosts are common. However, initiatives focused on developing research team leaders—faculty with the confidence, skills, and experience required to shepherd large-scale, collaborative, and team science projects—are far more rare.

This paper introduces the Research Leaders Program (RLP), an initiative to

identify and develop the next generation of research leaders at Nebraska.⁴ It outlines the background and framework for the RLP, which started during the 2020-2021 academic year. In addition, this paper showcases research growth plans developed by two faculty who completed the program and concludes by summarizing program benefits and opportunities for additional refinement.

Background

UNL's Office of Research and Economic Development (ORED) has a long record of providing services and programs focused on supporting early career faculty ramping up their programs and senior, more established investigators pursuing large-scale extramural funding.^{5, 6} However, around a decade ago,

senior research leaders at Nebraska noticed something of a gap that represented an opportunity space in the institution's portfolio of faculty support offerings. On the UNL campus, it was observed that a small number of faculty were routinely serving as magnet principal investigators and taking the lead on developing complex interdisciplinary, multi-institutional proposals. This led to thinking about what it would take for the institution to proactively develop the next generation of research leaders through a program to help faculty at mid-career and beyond win major external funding.

At the time, there were few examples of programs at U.S. institutions with an exclusive focus on research leadership development. The bulk of discoverable programming was focused on cultivating future academic leaders and growing the pipeline for future departmental executive officers, deans, and provosts.^{7,8,9} The most relevant work chronicled in the literature was led by institutions in the United Kingdom.^{10,11} Since the body of evidence was scant, ORED undertook something of a customer discovery process.

Senior ORED team members first met with six Nebraska faculty well-positioned to become future research leaders to find what they felt they needed to advance to the next level. The next step was asking a focus group of 12 established campus research leaders: "What do you know now that you wish you'd known then?" Collectively, faculty informants emphasized the importance of networking, a focus on innovation and impact, leadership development, and access to those at the highest levels of the university. These faculty-administrator conversations revealed that UNL's rising faculty research leaders are motivated and incredibly talented, but they indicated they would appreciate and benefit from support developing the skills needed to lead large, collaborative efforts.

The data from these conversations were used to have a conversation with colleagues in the Center for Executive and Professional Development (CEPD) in UNL's College of Business. Together, ORED and CEPD staff worked to create a program framework to help UNL research leaders maximize their potential and develop playbooks to achieve their research growth goals. The program framework is designed to help propel emerging research leaders—those individuals with the interest, vision, and motivation—to take their research programs to a higher and more collaborative level. It empowers research-active faculty with the information, skills, and connections they need to assemble and lead large-scale teams in the pursuit of major extramural funding. To achieve this, RLP centers on three objectives:

1. Develop the skills necessary to effectively build and manage large teams and projects.
2. Produce actionable roadmaps to secure major external funding.
3. Network with like-minded colleagues, university leaders, and public/private partners who can help advocate for and support the development of large, innovative, and impactful research programs.

RLP Content

RLP content focuses on the fundamentals of management and cutting-edge topics that high-impact research leaders need to know, including strategic, strengths-based leadership; goal setting; team science; diversity and inclusion; strategic communication; and innovation and design thinking. The program is delivered through five day-long modules. The group meets for one full Friday a month during the academic year (in September, October, November, December, and February). These sessions rely heavily on active learning and participant engagement. Many sessions are delivered by UNL faculty, but several are led by ex-

ternal instructors from the Santa Fe Institute; University of Arizona; University of California, Santa Barbara; University of Alabama at Birmingham; and University of Tennessee at Chattanooga.

The development of a personal research growth plan is a key element of the program. Participants are coached on a one-on-one basis to develop growth plans aimed at strengthening and elevating their research activities. Faculty spend half a day in March workshopping their research growth plan presentations. They receive peer and program instructor feedback before delivering final presentations in April. All faculty members who complete the program are granted a course release, funded by ORED, that they may use within the next two academic years to support the implementation of their growth plans.

Exemplar Research Growth Plans

Thirty UNL faculty have completed the RLP thus far. Each of them developed and presented their individual research growth plans as part of the program's capstone activity. During the program's final session each spring, participants present overviews of their research growth plans to their peers, associate deans for research, and executive campus leaders (e.g., chancellor, vice chancellors). When developing their research growth plans, faculty participating in the RLP are encouraged to develop a vision and mission for their program or laboratory, articulate a set of goals and a corresponding action plan, inventory existing resources available to support the actualization of their plan, and identify any resource gaps that may impede progress toward the fulfillment of their plans. Overviews of growth plans developed during the first two RLP cohorts are included below.

Amanda Ramer-Tait, PhD, Maxcy Professor of Agriculture and Natural Resources, Department of Food Science and Technology (2021-2022 RLP)

My participation in the RLP was very rewarding, and it benefitted me and our research program in multiple ways. First, it provided me with professional development beyond the lab bench and my research area. Second, it connected me with other faculty on campus—from history, English, and psychology—with whom I would typically not have the chance to interact. Finally, the program provided me with a framework to develop a strategic growth plan for our research program.

As a scientist, I was never exposed to the concept of strategic planning, but because RLP is delivered, in part, by faculty from UNL's College of Business, I learned to think about our research program as an enterprise—to think about our vision, our mission, our strengths, and how to set goals that move us forward. Now, I can more clearly articulate a vision for our team, which revolves around transforming human health through discovery and application of the principles and mechanisms underlying microbiota-host-diet interactions.

Our lab also now has a defined mission: to identify the causal relationships among gut microbes, diet, and disease processes. Our research team seeks to identify these causal relationships by creating and maintaining synergistic and multidisciplinary research collaborations and by combining molecular and bioinformatic tools with unique, preclinical gnotobiotic mouse models. Importantly, we support our research mission by mentoring students and postdocs in a safe and supportive environment that fosters their success as independent scientists.

RLP also taught me to think about what enables our lab to pursue this mission (i.e., our distinctive competencies). Critical to delivering on our lab's mission are my expertise and personal research accomplishments. I have been studying host-microbe interactions for over 20 years. Also enabling our mission is

our lab's strong track-record for student and trainee successes and the high value we place on teamwork, which we foster through social activities and togetherness.

The RLP also taught me to think about key resources that enable our growth. For us, our most important resource is our lab team. Another important resource is our network of collaborators in Nebraska, from across the U.S., and around the world. Also critical to our success is the Nebraska Gnotobiotic Mouse Program. Our germ-free mouse facility allows researchers to ask mechanistic questions about the role of the gut microbiota in health and disease. Another key resource and strategic partner in our growth is the Nebraska Food for Health Center. The center's mission is to identify food crops and molecules that provide clinically proven health benefits through modulation of the gut microbiota.

Because of these unique competencies and key resources, our lab is now well-positioned to tackle three strategic research initiatives. We want to (1) establish causal roles for gut microbes and their metabolites in chronic diseases, (2) identify the diet-microbiota interactions that improve disease outcomes, and (3) design microbiome-based strategies for treating diseases. To focus our efforts, the strategic growth framework I developed during RLP allowed me to clearly define projects where our lab was the lead versus others where we play a supporting role. For each of these projects, I created multiple SMART goals and assigned them timelines. This exercise allowed me to identify resource gaps for the key projects we wanted to grow, to think about how to fill those gaps, and to select which of our projects to sunset.

The next steps for our research team include regular re-evaluation of where we are with respect to our goals and our mission—we accomplish more when

we make these decisions together. I also want to use this strategic growth plan framework for my own personal professional growth and to build a sustainability plan for our Nebraska Gnotobiotic Mouse Program. Altogether, my RLP experiences have empowered me to think more strategically about how to grow a research program with impact.

Timothy Nelson, PhD, Professor, Department of Psychology (2020-2021 RLP)

As a part of my participation in the RLP, I developed a growth plan outlining new directions for my research with an emphasis on opportunities to build on my existing research program while setting ambitious goals for expanding my work. I am a pediatric health psychologist, and my research focuses on the interplay between early cognitive development, particularly executive control, and developmental trajectories of key health behaviors that affect long-term risk for obesity. I serve as principal investigator on multiple longitudinal studies funded by the National Institutes of Health.

In thinking about next steps for my research program, I identified an overarching goal to increase the impact and scope of my work in two important ways. First, I want to move toward conducting intervention and prevention research with children and adolescents. Up to this point, my research has been one step removed from intervention—focusing on identifying new potential targets for intervention but not actually designing and testing those new interventions. So, I want to take that next step and build on the findings of our longitudinal work and move into intervention development and evaluation to increase the applied impact of this research. Second, and also with an eye toward enhancing impact, I identified a goal of building strategic community partnerships to support the development and eventual dissemination of the inter-

ventions we will create into settings that serve children and adolescents.

Taken together, these new directions are intended to maximize the impact of our work on the health of children by translating our findings into new approaches for health promotion.

In considering how to tackle these ambitious goals, I identified some of the resources available to me and my team, as well as some of the gaps I needed to bridge.

In terms of resources, I found I could leverage existing NIH funding within my lab, the exciting findings emerging from our longitudinal studies, and some existing connections with community organizations. I also recognized there were significant gaps to fill. Most notably, I have relatively limited experience leading large-scale intervention research (particularly using randomized controlled trial designs). This is where I want my research to go, but I need to bolster my record in this area. It also became clear that I would need a plan for even more robust engagement with community partners to realize the dissemination goals of my plan. We have the beginning of this, but really need to step up the engagement to accomplish our goals.

With resources and gaps in mind, the next step in developing the growth plan was to develop specific strategies to achieve my goals. The big-picture summary is that I developed a multi-pronged approach to create strategic collaborations that would enhance our team's capacity to do intervention research and meaningfully engage with community partners.

To build capacity in intervention research, I am pursuing new collaborations with researchers who have extensive experience conducting large-scale, NIH-funded intervention studies in pediatric obesity. Their expertise and existing infrastructure for conducting random-

ized clinical trials will allow me and my team to rapidly scale up our capacity for translating findings from our longitudinal studies into new interventions. I have been fortunate to build on connections with consultants on my existing grants who have this specialized expertise, and we now have multiple intervention R01 proposals under review.

I am also pursuing more significant and formalized connections with community partners, including a network of local pediatric primary care practices and public schools. These relationships take time to build, but we are making excellent progress. For example, we strengthened our connections with a large pediatric primary care practice in town and wrote a grant that would explicitly focus on further developing this collaboration. This process has left us well-positioned to really engage with our community partners as this line of work matures. Overall, the process of developing and implementing a growth plan has been incredibly useful in directing my efforts to strategically build a research team to increase the impact of our work.

RLP Logistics

Currently, participation in RLP is limited to 15 faculty annually. Associate and full professors, as well as research associate and full research professors, are eligible to participate. A primary program goal is to leave many ladders down to attract the most diverse pool of potential participants. Each spring, ORED widely solicits nominations for prospective participants; however, nomination is not required, and all eligible faculty may apply.

Applications are screened by senior leaders in ORED, and final selections are made based on conversations with associate deans for research and departmental executive officers. Three RLP cohorts have been seated: 2020-2021, 2021-2022, and 2022-2023. To date, faculty interest in

RLP has exceeded program capacity, and acceptance rates have ranged from 40% to 65% across the first three years of the program. Direct costs for RLP instruction average \$5,000 per participant. Costs for course release vary by academic college at Nebraska—they range from a flat rate of \$7,500 to one-sixth of a faculty member’s salary. As a result, ORED invests \$12,500 to \$25,000 in each faculty member selected for RLP.

Conclusion

At Nebraska, the emphasis on developing research leadership is emerging as one of the cornerstones of the institution’s approach toward supporting intentional research team building. For research teams to succeed, it is not enough for their leaders to be at the top of their game in pure research or creative activity. Through the RLP, the institution has

intentionally made research leadership a focus. To date, program evaluation has been almost exclusively qualitative. Faculty participants have observed numerous benefits when asked to reflect on their RLP experiences. These benefits include being connected to like-minded, similarly motivated individuals; learning how to develop a research vision, mission, and growth plan; spending focused time reflecting on the innate strengths individuals bring to their leadership roles; and discovering opportunities for connecting and potentially collaborating with faculty from other units. Going forward, there is opportunity to assess program impacts and outcomes in a more rigorous way. The need for this will increase as additional institutions begin to implement faculty development programs focused explicitly on research leadership.

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