Just as Nebraska Athletics has long been regarded as a pioneer in the field of collegiate strength and conditioning programs, was among the first to emphasize the link between health and nutrition and athletic performance and stood in the vanguard in life skills training for student-athletes, the University of Nebraska–Lincoln (UNL) now is taking the lead by integrating athletics and research and using cutting-edge imaging technology to better elucidate the biological underpinnings of behavior and performance. No other university in the nation is conducting research in this way.
This emerging collaboration between athletics and research at UNL led to allocation of space in the East Stadium addition to Memorial Stadium for a 50,000-square-foot research area. The proposed Center for Brain, Biology and Behavior (CB3) will occupy space in the south half of the East Stadium addition, and the north half will be dedicated to the Nebraska Athletic Performance Lab (NAPL).

CB3 will house a radiology unit and a state-of-the-art functional magnetic resonance imaging (fMRI) magnet, which will enable investigations related to behavior and performance, including the study of concussions. The research facility also will provide shared space, including 48 laboratories and a common area large enough to accommodate 40 to 50 people.

This space is envisioned as a “brain trust,” allowing science work groups to exchange information. Glass walls will draw people out of offices to communicate with each other, and a bridge will connect with the NAPL, which will focus on areas critical to increased performance and health among student athletes, including technology, nutrition, psychology and learning.

On August 23, UNL faculty from a wide variety of departments and key representatives of the athletic department gathered, along with current and potential NAPL partners, to take the first steps in launching this collaboration between athletics and research.

The kickoff event provided an opportunity for participants to learn more about the new East Stadium research facilities, participate in a discussion of future research activities and explore ways UNL faculty and others can become involved in this unique collaboration.

Chancellor Harvey Perlman articulated the university’s vision for this unprecedented enterprise: Putting good people together leads to good things, and the creation of the two research spaces in Memorial Stadium will be a compelling catalyst for interaction. He sees a special niche for Nebraska Athletics in this unique integration with research — one that is productive and constructive, providing proof that “our athletic program is not only up to winning, but we’re offering our student-athletes the opportunity to use the program to provide information that may be more broadly helpful to society than just performance.”
Tom Osborne, Nebraska Athletic Director, noted that the East Stadium expansion project creates an opportunity for Nebraska Athletics to make a significant contribution to UNL’s academic mission. He outlined three reasons athletics is committed to a partnership with research.
1. To make sure that what Nebraska Athletics is doing makes sense and is based in sound research – not simply because “we’ve always done it that way.” For example, some conditioning activities, like the bench press and the duck waddle, had long been part of the football training repertoire, but no research demonstrated that these activities in any way improved an athlete’s performance. Now the Athletics staff is teaming with cardiologists at BryanLGH Heart Institute to learn more about what cardiology research can tell us about athletic performance. How can an athlete generate more force to increase speed? How much recovery time is needed to maintain an athlete’s health?

Nutrition research is guiding Nebraska Athletics’ decisions about how to spend money on nutrition supplements to most efficiently replace calories burned on the field. For example, Athletics spends $250,000 on supplements annually. But do they work?

An investment in software developed by Nebraska Global is helping department staff assess performance. Motion analysis of an athlete lifting weights can answer myriad questions: How much weight is the athlete lifting? How far is the athlete lifting it? What impact does the weight have on range of motion? Another software investment has allowed UNL to develop a secure Web portal accessible to a student-athlete or the athlete's parents to provide information about how the student is performing academically and athletically, the state of his/her health and nutrition and more. Such a tool is a boon to recruiting, too, because parents are more willing to send their children to UNL knowing that the Web portal gives a clear and constant window into the well-being of their children while they are students at the university.

Athletics is now eager to invest in equipment for brain studies and head injury research, with the dual goal of helping athletes avoid injury and teaching staff to recognize and respond to head injuries.

Psychology research also is critical to athletic performance. Even the best conditioned athlete may not succeed if other issues, like personality disorder, motivation and ability to persevere, stand in the way.

2. To foster outreach to the academic community. In a climate of fiscal cutbacks, as Athletics continues to develop new facilities, there is the danger that academic faculty may feel left out. The new East Stadium facility is designed to include the academic community on a number of levels. More than 30 academic units can take advantage of CB3’s fMRI imaging capability, fostering powerful synergy between athletics and academics and opening opportunities for broader grant funding for faculty and increased opportunities for students in the form of graduate assistantships or research training.

3. To improve recruiting. The East Stadium research facility is the next step in a long line of innovations that began with Nebraska Athletics – following, for example, leadership in the areas of strength and conditioning training, nutrition and life skills coaching – that will set Nebraska apart, making the university’s athletic programs highly attractive to recruits and their parents. The goal is
to do everything possible to make an athlete's experience at Nebraska safer and more productive.

**Prem Paul, Vice Chancellor for Research and Economic Development**, hailed the kickoff conversation as a unique event, noting that not often – at any university – do athletics and academics come together in this way with partners from the private sector and medical community.

He identified the common goal of the developing collaboration between athletics and research: to explore research opportunities and find areas of mutual interest. The partnerships that will take place in East Stadium, especially in the area of brain research, have the potential to help not only athletes, but also soldiers and all citizens. It is critical, he said, to learn about each other and put issues and ideas on the table. The more we all know about CB3 and the NAPL, with significant input from faculty and other partners, the sooner we bring the vision for the partnership to reality.

Nebraska is already on the national radar in partnership between research and athletics, through the Big Ten/Committee on Institutional Cooperation (CIC) and Ivy League Concussion Research Initiative directed by UNL psychology professor Dennis Molfese. Now, the new research facilities in the East Stadium have the potential to become a center of excellence at the university, with significant impact on funding from the National Institutes of Health, National Science Foundation, U.S. Department of Health and Human Services and the private sector.

Paul thanked all friends of research at Nebraska Athletics, especially Tom Osborne; Marc Boehm, Executive Associate Athletic Director; Doak Ostergard, Outreach Director; Pat Logsdon, Associate Athletic Director/Senior Woman Administrator; and John Ingram, Associate Athletic Director for Capital Planning and Construction. He acknowledged academic support for the athletics-research collaboration from Chancellor Harvey Perlman and Senior Vice Chancellor for Academic Affairs Ellen Weissinger; Deans Archie Clutter, Agricultural Research Division; Marjorie Kostelnik, College of Education and Human Sciences; and David Manderscheid, College of Arts and Sciences; and David Hansen, Professor of Psychology, and Julie Honaker, Assistant Professor of Special Education and Communication Disorders. And he thanked Office of Research staff members Deb Hamernik, Interim Associate Vice Chancellor; Mike Zeleny, Assistant Vice Chancellor; and Karen Underwood, Project Manager, for logistic support. Finally, he acknowledged strong advocacy from the Board of Regents, especially Tim Clare and Jim McClurg, both of whom participated in the Kickoff Conversation.
Dennis Molfese, Mildred Francis Thompson Professor of Psychology and Director of the proposed new Center for Brain, Biology and Behavior, outlined the philosophy motivating the establishment of CB³ and offered examples of the game-changing research the new facility can foster – to understand not only how to deal with brain injury, but how the normal brain works.
Leveraging sophisticated brain imaging tools like fMRI, Molfese is confident CB$^3$ can help the field of neuroscience move from “neural phrenology” to more in-depth understanding of the brain’s neural spatial and temporal interconnectivity, enabling researchers to explore the characteristics of neural processing within and between the brain’s regions. The unique inventory of research resources and facilities that will be available at CB$^3$ includes:

- fMRI
- High-density infant and adult Near-Infrared Spectroscopy (NIRS)
- High-density Electroencephalogram (EEG)/Event-Related Potentials (ERP)
- Transcranial Magnetic Stimulation (TMS)
- Behavioral science lab
- Balance lab
- Computer lab
- Developmental lab
- Endocrine lab
- Eye tracking lab
- Genetics lab
- Political science lab

CB$^3$ will be the only facility in the nation to simultaneously record fMRI, eye tracking and EEG/ERP data.

The center already is providing access to and training in the use of many of these resources for diverse segments of the UNL community, including biological scientists, social and behavioral scientists and researchers more broadly focused on health and performance. To date, more than 225 faculty, students and research laboratory personnel have participated in a series of two-day workshops focused on brain imaging techniques, and 70 individuals have completed advanced imaging training offered by CB$^3$.

Training goals are to 1) introduce the theory and literature relevant to CB$^3$ resources, as well as the types of analyses the equipment housed within the facility can support and 2) provide hands-on experience focused on imaging equipment setup and data collection, processing and analysis.

**Impacts and Implications**

The implications for this cross-disciplinary research approach are significant. Each year, 1.5 million Americans suffer new head injuries. Many of these injuries are sports related, but the majority are experienced during car accidents or on the battlefield.
Molfese expects the work of UNL scientists to inform biomedical and behavioral science, as well as clinical practice, and to benefit society by leading to the development of innovations that enhance the prevention, detection and treatment of severe head injuries. In the long term, Molfese imagines societal benefits will accrue as a result of research that:

- employs brain imaging procedures to identify distortions produced by brain injury;
- identifies interventions that can produce more normal neural processing;
- uses successful interventions to enable individuals suffering from head injuries to perceive and interact with the world in more normal fashion.

More immediately, CB3 is working to make an impact in the area of sports concussion research. Molfese said current limitations to such research include:

- a paucity of information about brain and behavior prior to concussion;
- lack of long-term follow-up to concussion using standardized protocols;
- limitations of current approaches to concussion testing (e.g., current tests are not effective in measuring attention or working memory);
- difficulty accessing information about prior head injuries;
- falsification of pre-season tests by athletes;
- pressure for athletes to resume play following possible head injury;
- lack of research-based information regarding when athletes can safely resume play following concussion.

Through its unique partnership with Nebraska Athletics, CB3 is positioned to address several of these challenges and has assumed a national leadership position in the area of sports concussion. Molfese leads a concussion research initiative involving the Big Ten and Ivy League athletic conferences, in conjunction with the CIC. The consortium of academic research and athletic programs was formed to examine and address concussions and other head injuries among student-athletes.

The Big Ten/CIC and Ivy League concussion research initiative is unique in its focus on short- and long-term involvement by athletes who agree to take part. Student-athletes complete preseason screening to provide baseline information, then engage with researchers over time to provide benchmark data related to performance, neurocognition and key brain measures from injured and noninjured students.

The goal is to establish a study population across sports and genders to enable researchers to assess the impacts of concussions and head injuries during the longer term, including the likelihood of re-injury. Study data will be available in a database with shared access for researchers across the two conferences.

Molfese hopes to move the needle on sports concussion detection and treatment through improved interventions and concussion awareness programs and to facilitate concussion prevention through improved protective equipment design. This unprecedented collaboration between research and athletics can, Molfese said, enable UNL to “go out and kick some serious neuro-butt.”
Doak Ostergard, Outreach Director for Nebraska Athletics, described the rationale for the Nebraska Athletic Performance Laboratory (NAPL), which will occupy the north half of the East Stadium expansion. NAPL will be a hub for cross-disciplinary collaboration involving UNL researchers, Athletics and community partners to advance athletic science and improve all dimensions of the student-athlete experience at Nebraska. Broadly construed, NAPL will enable research teams from multiple UNL departments to partner with Athletics and address topics that relate to performance and health, technology, nutrition, psychology and learning.
Ostergard introduced two partners already working with Nebraska Athletics on projects related to student-athlete health and performance: Steve Kiene with Nebraska Global and Steven Krueger with BryanLGH Heart Institute.

Steve Kiene, Managing Principal at Nebraska Global, presented his firm’s approach toward industry-university collaboration and an overview of Nebraska Global’s ongoing involvement with UNL and Nebraska Athletics. A $37 million technology investment fund founded in 2010, Nebraska Global aims to establish a supportive environment for Nebraska-based technology startups. Primarily an incubator for software businesses, Nebraska Global has made seven investments to date. The group is heavily focused on retaining Nebraska talent in the state – chiefly by providing student internships, aggressively recruiting and hiring new graduates and investing in Nebraska people and their talent.

Nebraska Global provides considerable support for UNL students. The firm catalyzed the creation of the Jacht Club, a student-run advertising agency led by the College of Journalism and Mass Communications, and has collaborated on a number of senior design projects within the Department of Computer Science and Engineering.

So far, three design studio projects led by students in the Jeffrey S. Raikes School of Computer Science and Management have been commissioned by Nebraska Global. In addition to engaging Raikes School talent through these design studio projects, Nebraska Global personnel serve as project team coaches and mentors and provide adjunct instruction within the school.

As a precursor to the types of projects that can be realized once NAPL is finished, Nebraska Global has signed a formal agreement to partner with Nebraska Athletics and collaborate on software products that can benefit student-athletes. The focus of this partnership is to develop software with the power to enhance safety and performance and to commercialize these products when appropriate.

Nebraska Global is interested in projects that have their roots in Tom Osborne’s mantra that Nebraska Athletics can achieve success by respecting its key traditions – but sees the value questioning tradition, as well. For that reason, additional collaborative projects are expected to emerge in areas where Nebraska paved the way in collegiate athletics: weight and conditioning training, nutrition, life skills, etc. Examples of projects that align with UNL research interests include:

- biomedical research projects, including on-field tablet-based concussion diagnostics;
- strength and conditioning projects, including 3-D motion analysis;
- recruitment initiatives, including a web-based information portal for parents of student-athletes;
- nutrition projects, including an innovative weigh-in system;
- tools for online athlete assessment, enabling coaching staff to provide real-time feedback.
Looking ahead, Nebraska Global is excited by the opportunity to partner with Nebraska research and athletics within NAPL and to help bring research to the playing field quickly. Potential work areas include student-athlete physical therapy, skill-based motion analysis and functional screens (innovative systems to assess the quality of an athlete’s movement patterns).

The coordination between university and industry partners at the heart of NAPL is exciting to Kiene, who noted that at other institutions the management of health and performance labs is often disjointed. Frequently, academic researchers conduct work that athletic departments know nothing about or even consider irrelevant and vice versa. The unique partnerships that will be housed in East Stadium have the potential to serve as models for other commercial entities seeking collaborations with university-based research.

Steven Krueger, a cardiologist at BryanLGH’s Heart Institute, believes the research and practice of state-of-the-art clinical cardiology care is critical to student-athletes’ overall safety and performance. For this reason, Krueger and his colleagues are partnering with Nebraska Athletics to create ATHLetic Evaluation TEsting and CArdiology REsearch (or ATHLETE CARE) to provide advanced evaluation and treatment of cardiovascular issues in athletes. To meet this goal, they will develop strategies and tools to identify athletes at risk for developing cardiovascular injury or disease and, when possible, to introduce preventative treatment.

ATHLETE CARE will assemble a research team to identify the most pressing athletic cardiology issues and strive to lead a global network of athletic cardiovascular specialists across the country, beginning with partners throughout the Big Ten Conference. In the long term, the group hopes to extend its work beyond collegiate athletics to populations of high school athletes, for example, or adult cardiovascular patients.

Krueger noted cardiovascular problems among student-athletes are unusual, but not rare, and frequently are catastrophic when they occur. Available data on athletes’ cardiovascular health – most frequently collected by electrocardiogram, echocardiogram and MRI – are “weak” and do not present a clear course for the prevention, detection or treatment of cardiovascular disease among student-athletes.

Further complicating these issues is the fact that the longitudinal progression of athletes’ hearts is not well known. New cardiovascular approaches and diagnostic tools are critical to identify and treat student-athletes at risk of coronary artery disease or other aortic diseases, such as Marfan syndrome or bicuspid aortic valve. Associated conditions, such as obstructive sleep apnea, may interfere with an athlete’s ability to perform on the field or in the classroom.

Because Nebraska’s student-athletes deserve the best, an organized multidisciplinary approach like that facilitated by the NAPL is essential to address these issues and provide the best cardiac care available. It is critical to assemble leading experts who are capable of making clinical assessments for borderline and difficult situations, including pulling athletes from games unnecessarily or not disqualifying athletes at risk of further injury or negative health impacts.
KEYNOTE: HOW BIOMARKERS IN SALIVA CAN BENEFIT YOUR RESEARCH PROGRAM

The luncheon keynote speaker was Douglas Granger, Professor of Acute and Chronic Care and Director of the Center for Interdisciplinary Salivary Bioscience Research at Johns Hopkins University. A portion of the research center in the East Stadium expansion will be a laboratory devoted to the study of biomarkers – characteristic biological properties that can be detected and measured in parts of the body like blood, saliva or tissue.
History of Granger’s Saliva Research
Granger began researching biomarkers in saliva nearly two decades ago as a graduate student studying biological reasons for problem behavior in children. He found many families did not want to participate in the study because numerous blood samples were required, and the children resisted the use of needles during blood draws. Instead, Granger began gathering saliva samples, a procedure that is much less invasive and painful for children.

In his keynote presentation, Granger described his saliva research and the science behind it, with the goal of exploring the applications of biomarker research in athletics. For more in-depth information about biomarker research in general and Granger’s research in particular, see his presentation “Integration of Salivary Bioscience into Behavioral, Health and Sports Sciences”: http://research.unl.edu/athleticsandresearch/Granger_UNLPresentation.pdf.

Focus on Stress Response
Granger’s work now focuses on stress reactivity and the reciprocal relationships between biology and behavior. He cautions that researchers need to understand the context in bio-behavioral relationships, both the broad context and the micro-context. It is important to look at relationships in everyday situations, and use of saliva helps assess bio-behavioral relationships in actual time.

Stress response is a fast-acting physiological process that kicks in when we need to adjust to environmental change if we cannot adapt in the usual ways. The stress response diminishes or disappears as the situation becomes more familiar. Researchers can measure initial reaction to stress using salivary cortisol and enzymes (adjustments at the slow-acting level, however, are typically manifested as changes in gene expression, not easily measured with saliva).

Granger identified numerous advantages of using saliva to identify and measure biomarkers associated with stress response:
- It is simple to collect.
- Collection procedures are non-invasive.
- Self-collection is possible and easy to do.
- It is possible to collect samples from a large group in a short amount of time.
- Cortisol moves easily through cell membranes into saliva.
- Testing can be done in hours and in batches.
- Multiplexing technology means up to nine different analytes can be tested simultaneously from one sample.
Some of the things researchers have been able to measure in saliva include: cortisol, analytes related to environmental hazard exposure, markers related to inflammation, melatonin, disease-specific antibodies, electrolytes, DNA and analytes related to traumatic brain injury.

**Applications in Athletics and Future Directions**

Granger suggested a number of directions for using biomarkers to study stress response in athletics research, including studies to address research questions such as:

- Are there gender differences in how athletes approach competition and training?
- What is the impact of the experience of the athlete on stress response?
- Can we determine the likelihood of an athlete getting sick and measure the impact on performance?
- Using the ratio of cortisol to testosterone, can we predict stress levels and determine an athlete's stress threshold?
- How do social networks (ingroups vs outgroups) influence stress levels?

A salivary biomarker science center related to athletics also can have applications in the larger scientific community. UNL, with a focus on athletics, can establish itself as a unique player in the global network of biomarker research labs.
Interim Vice Chancellor for Research and Economic Development Deb Hamernik facilitated a panel of UNL faculty from a variety of fields who discussed ways their interests might intersect with the research proposed by CB3 and NAPL. Each panelist described his or her current research and the role it might play in the athletics-research collaboration.
Julie Honaker, Assistant Professor of Special Education and Communication Disorders and Director of the Dizziness and Balance Disorder Lab, is a hearing and balance specialist who studies the effects of sports-related head trauma on the balance system, balance dysfunction across the lifespan and objective balance measures for predicting falls.

Dizziness is one of the most common post-head injury complaints, and unrecognized balance problems may lead to anxiety and depression, headache, sleep disturbances and poor academic performance.

Honaker is undertaking research to identify balance function changes over time and improve traditional concussion measurements. This research will increase understanding of the results of sports injuries and introduce more objective measures for concussion assessment and recovery monitoring.

Namas Chandra, College of Engineering Distinguished Scholar and Professor of Mechanical and Materials Engineering, heads the Army-UNL Trauma Mechanics Research Initiative. One aspect of his research is the study of sports injuries.

High-speed cameras on the football field record a collision during play. Biomechanical analysis is conducted using MaxTRAQ 3-D, a 3-D motion analysis software module from Innovision Systems; the resulting data are used for experiment modeling and simulations, with the ultimate objectives of designing better helmets to reduce the incidence of collisions and enhance quality of life.

Fred Luthans, University and George Holmes Professor of Organizational Behavior in the Department of Management, sees opportunities to apply the principles of Psychological Capital (PsyCap) – the science behind what coaches call “drive” or “heart” – to athletics and to test the hypothesis that higher levels of PsyCap lead to higher levels of performance.

Luthans believes it is time to expand PsyCap research and explore its effective application to athletics, by:
- using alternatives measures to develop PsyCap in athletic contexts (positive teams, cultures, universities);
- developing PsyCap interventions in the areas of self- and coach-led development, as well as athlete selection, performance and team-building;
- exploring the applicability of PsyCap in understanding emotional and behavioral styles.

Debra Hope, Professor of Psychology, Director of the Anxiety Disorders Clinic and Clinical Director of the Weibling Project for the Psycho-legal Study and Treatment of Discrimination, studies the nature of anxiety to inform treatment technologies and make good treatment broadly available.

Hope investigates attentional biases, functional and dysfunctional coping strategies and the impact of anxiety on behavior and performance. Her interest in sports anxiety fits well within the athletic-research collaboration. She identified a number of tools she could bring:
- computer-based assessment of attentional biases;
- strategies for assessing anxiety, including self-report, physiological markers and behavioral observation;
- individual and group interventions to prevent, manage or reduce stress and anxiety;
- telehealth;
- assessment and intervention around experiences of bias or discrimination;
- outpatient clinics for mental health services.

Scott Stoltenberg, Assistant Professor of Psychology, directs the Behavior Genetics Laboratory and studies the pathways from genes to behavior. He sees potential for collaboration in a number of areas, especially in understanding how genetic differences may account for individual differences in athletic performance or risk for injuries. Traits such as impulsivity, anxiety and aggression are influenced by genes and may mediate this pathway. It is easy to collect genetic material for these studies, since samples can be obtained from saliva or cheek cells. The BGL routinely extracts DNA
to perform genotyping and collects behavioral data.

Mario Scalora, Professor of Psychology, is interested in safety issues and athletics. His research explores why people harm other people and seeks ways to detect and protect against such harmful behavior.

He sees opportunities for data sharing and collaboration among Big Ten universities on threatening activity such as stalking, domestic violence, harassment, disgruntled fan activity, threatening communications, extremist activity and violence.

Several noteworthy trends in electronic communication also can be the focus of study:

- Threatening language is more prevalent.
- Threatening email and other electronic/internet activity is increasing.
- Emotionally driven activity and rhetoric are becoming more intense.
- More extremist language is coming from a range of domestic and transnational sources.
- Victims are setting a higher threshold for reporting electronic threats.

Scalora also noted that athletes are becoming more susceptible to harassment and that outside extremist groups are employing different tactics. Therefore he sees a natural research collaboration with Athletics to monitor crowd behavior.

Timothy Carr, Professor and Interim Chair of the Department of Nutrition and Health Sciences, reiterated the strong relationship between his department and Nebraska Athletics over the years, pointing out that Dave Ellis was the first person in the U.S. to be hired as a full-time nutrition support person in an athletic department. The focus on health and well-being necessitates an understanding of the relationship between nutrients and physical performance—what athletes eat, how they eat and how cultural factors form an athlete's life experience.
He identified a variety of expertise and methodologies his department could bring to a research collaboration with Athletics:
- dual-energy X-ray absorptiometry (DXA) to study body composition;
- hydrostatic weighing to study body composition;
- electromyography and mechanomyography to study muscle fatigue and function;
- ultrasound to study muscle size;
- blood chemistry to study lipids and inflammation markers;
- diet assessment to study complete nutrient intake analysis.

Discussion
Brief discussion followed the panelists’ remarks. Regent Jim McClurg asked where the motivation for collaboration would come from when faculty already are overworked. Fred Luthans noted that collaboration is no longer a choice – researchers are becoming more and more dependent on colleagues in other disciplines.

In response to a suggestion that departments establish a “collaboration index,” Mario Scalora cautioned participants to be wary of measures for collaborations because they occur at different levels. Collaboration involves a broad-based set of behaviors and is difficult to reward. Scott Stoltenberg observed that researchers look for collaborations that fit into what already exists, and Namas Chandra added that collaboration often is based on what you need to advance your research. Stoltenberg said that in his case he does basic research and has not given much thought to application; however, he believes that genotype connection to stress response is a feasible research direction, and while behavioral genetics is in an early stage, he welcomes ideas about collaboration. Carr indicated it is critical to be more strategic in future hires and think more broadly about topics rather than about departments.

Nancy Myers, Director of Organization Development, asked if UNL has best practice models for interdisciplinary research. Debra Hamernik responded that NIH- and USDA-funded programs at UNL offer models for collaboration, noting that leadership is key, and it is critical that new centers on campus use existing structures that facilitate collaboration. Hamernik also briefly described UNL’s participation in Research Nebraska, a Web-based directory that enables users to search nationally for research collaborators and scientific experts. She suggested more gatherings like this one that allow faculty to interact, talk and share.
Wrapping up the kickoff conversation, Vice Chancellor Prem Paul facilitated a panel discussion during which members of the university community and external experts shared key observations made during the day-long meeting and offered suggestions for next steps to help sustain the momentum surrounding the research-athletics collaboration.
Participants were: Douglas Granger, Professor of Acute and Chronic Care and Director of the Center for Interdisciplinary Salivary Bioscience Research at Johns Hopkins University; David Hansen, Professor, Department of Psychology, UNL; Marjorie Kostelnik, Dean, College of Education and Human Sciences, UNL; Dennis Molfese, Mildred Francis Thompson Professor of Psychology and Director, Center for Brain, Biology and Behavior, UNL; Doak Ostergard, Outreach Director, Nebraska Athletics; and Jeffrey Stout, Associate Professor, Department of Child, Family and Community Sciences, University of Central Florida.

Collectively, the group praised UNL and Nebraska Athletics for providing a unique foundation for interdisciplinary collaborations spanning health and performance and diverse areas of expertise, including nutrition, medicine, psychology and technology, among others. Panelists concurred there is a great deal of potential surrounding the scientific discoveries made possible by the expertise and resources coalescing within the East Stadium expansion.

Key observations shared during the discussion included:
- The physical resources available to the research-athletics collaboration at Nebraska are incredible and will benefit student-athletes and society.
- The variety of individuals participating in the kickoff conversation – from on and off campus – was impressive and reflected shared enthusiasm among UNL, Nebraska Athletics and community partners.
- New collaborations seeking to integrate individuals and expertise from academics and athletics must be cognizant of the challenges that may arise due to differences in organizational culture.
- The partnership between research and athletics at UNL reflects interest in and commitment to interdisciplinary collaboration at the university.

Next steps proposed during the panel discussion included:
- Move quickly to articulate, refine and communicate a set of priorities for the work to be conducted in East

Stadium and ensure the necessary resources are in place to foster success.
- Hold additional, focused conversations organized by specific themes or lines of research and provide ongoing opportunities for others to contribute their expertise and talent.
- Assemble a panel of external advisers to help guide the strategic direction for and oversight of CB3 and NAPL.
- Secure additional institutional support for strategic faculty hires in areas that will complement the work of CB3 and NAPL.

The panel issued a strong reminder that strategic focus and robust leadership are essential going forward to ensure excellence among the research programs that grow from the coordination between research and athletics at UNL.

MORE INFORMATION

For more information regarding the collaboration between athletics and research at UNL, please visit:

research.unl.edu/athleticsandresearch

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