

Overview

The University of Oklahoma intends to be at the forefront of addressing global challenges and is launching the **2nd OU Big Idea Challenge**. The BIC 2.0 is intended to incentivize the formation of transdisciplinary, convergent research teams focused on global grand challenges and will provide seed funding to incubate ideas with the potential for future extramural support and significant societal impact.

Background

As a flagship public institution keenly focused on societal impact through research and creative activity, the University of Oklahoma is uniquely positioned to bring a diverse set of academic disciplines together to foster innovative, comprehensive solutions to global challenges. [Pillar 5 of the Lead On, University Strategic Plan](#) defines four strategic verticals that focus on grand challenges in:

- Aerospace, defense, and global security
- Energy and environmental sustainability
- The future of health
- Society and community transformation

In addition, OU's research framework recognizes the importance of various academic areas of research and creative activity that serve as foundational elements of our research strategy. In our [vision for research and creative activity](#), researchers move beyond and across traditional academic boundaries, collaborating across disciplines and globally with other universities, policy makers, economists, humanists, artists and designers, and business leaders to create solutions for a better world. Our goal is to transcend academic disciplines and bring all of OU's institutional strengths together to tackle global challenges and accelerate the delivery of practical solutions that impact society in direct and tangible ways.

To address global grand challenges and positively impact society at the global, national, and regional scales, innovative approaches and new methodologies that converge the perspectives from science, engineering, business, social sciences, arts, design, and the humanities are needed. Transdisciplinarity occurs when two or more discipline perspectives combine to transcend traditional boundaries and form a new holistic approach. The outcome will be completely different from what one would expect from the addition of the parts.

Transdisciplinary research is defined as research efforts conducted by investigators from different disciplines working jointly to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to address a common problem.

The BIC 2.0 program builds on the tremendous success of our recently concluded first [Big Idea Challenge initiative](#), launched in 2021, and will provide resources to transdisciplinary teams of OU faculty, students, postdocs and research staff pursuing bold projects that go well beyond traditional inter- and multidisciplinary efforts. BIC 2.0 is intended to disrupt our current research frameworks and approaches, which are often siloed and too dependent upon department- and college-centric thinking. These projects will position the University as a leader in generating new insights and game-changing contributions to solving regional, national and global challenges in security, sustainability, health, and communities.

The transdisciplinary teams supported by BIC 2.0 will pursue system-level projects that integrate social, political, ethical, legal, humanistic, design, and creative arts considerations with advanced science and engineering ideas to generate new holistic impacts and outcomes. Integrating science, engineering and design and creative arts thinking with the deepest analysis of societal impacts and risks while keeping the "big picture" in mind will ensure that the great idea your team will bring to life will be truly transformative. We welcome proposals for projects that advance social justice goals of diversity, equity, and inclusion in research and public impact.

Scope and Themes

The BIC 2.0 program will fund **three to four teams**. Project periods will last **up to two years** (depending on the scope of the proposal). BIC 2.0 is **not intended to provide all the resources** required to create the ultimate solution to a global challenge, nor to fund a center or an institute. Rather, the purpose of the program is to **help nucleate teams and ideas** that will create opportunities for new and significant external funding—both public and private. The creation of these opportunities will position OU as a national and global leader in the selected areas and thus grow the scope, scale and impact on society of OU's research and creative activity. At the same time, it will chart new pathways to discoveries, innovations, and social and policy solutions, while training the next generation of future transdisciplinary talent.

The themes for the BIC 2.0 program align with OU's Lead On, University Strategic Plan, and with the [strategic framework for research](#). In addressing these themes, successful proposals will be cross-cutting and multi-faceted, involving integrated **equal contributions** to the overall project from faculty in the **arts, humanities, professional programs and STEM** disciplines, as appropriate.

Listed below are four BIC 2.0 thematic focus areas where teams of OU researchers could address global grand challenges. Proposals that cut across these topics (within or even preferably across themes) and bring multiple areas together to pursue a big idea are highly encouraged and will be given priority.

Theme 1: Climate change and its regional, national, and global impacts on human well-being and security

Climate Change is accelerating, and its impacts are being felt increasingly around the world. The scientific consensus expressed via the Intergovernmental Panel on Climate Change (IPCC) 2023 6th assessment report states with *High Confidence* that "Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts

and related losses and damages to nature and people, beyond climate variability;" and "Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought and fire weather." These impacts, which are compounded by other human influences such as deforestation, destruction of wetlands, urbanization, etc., include severe threats to human health and security as well as growing geopolitical instability, particularly in highly vulnerable, not resilient geographies around the world. A noted [climate policy expert](#) argues further that engaging "the social sciences are central for understanding how people and societies comprehend and respond to environmental changes." We wish to explore and support areas of investigation such as:

- Research that aims to improve climate change and extreme, severe weather models and predictions, including the acquisition and integration of new data that helps better understand the coupled earth-ocean-atmosphere system.
- Creative ideas to inform human and system adaptation strategies to the growing threat of climate change, particularly for vulnerable communities.
- How to improve communication strategies around climate change and extreme weather. In particular, approaches to optimize the public's understanding, preparedness and response to such extreme weather events.

Some representative example themes of interest include, but are not limited to topics such as:

- How to mitigate the impact of climate change on human health and health equity – from Oklahoma to the Global South.
- What new geopolitical stresses arise that are driven at least in part by accelerating climate change, what opportunities arise for authoritarian regimes to gain and exert influence globally, and what are the threats that these instabilities pose to advanced democracies.
- How to develop global partnerships that can help emerging economies in the developing world prepare for and adapt to the future impacts of climate change, becoming more resilient and less vulnerable.

Theme 2: Artificial Intelligence (AI) and Machine Learning (ML) applications for scientific discovery and social well-being

Large Language Models (LLMs) are extraordinarily adept at writing scientific code and facilitating the exploration of new frontiers of scientific discovery. Beyond the popular application of LLMs in search engines, report writing, and more, AI and ML tools are providing tremendous new capabilities. OU is at the frontier AI/ML applications for modeling and prediction of weather patterns, for example. We wish to explore new frontiers in the application of AI/ML to scientific discovery in areas such as chemistry, materials science, physics, the biosciences, and the engineering disciplines. Additionally, AI/ML research must take a holistic approach that ensures that such investigation can be translated and accepted by society. Access to powerful scientific discovery tools such as AI/ML must become part of the K-12 and higher education learning

curriculum across all communities. Otherwise, further social inequalities will be driven by these new discovery tools. Efforts that integrate these societal and educational considerations into the proposed scope of work will be prioritized. BIC 2.0 submissions addressing this theme must incorporate a deep analysis of issues such as trust, bias, and ethics when considering the development of AI/ML tools and algorithms that lie at the intersection of technology and society.

Theme 3: Materials science and engineering as an enabler of future technological advances across verticals

Materials science and engineering is an inherently interdisciplinary field of research that lies at the intersection of basic science and engineering disciplines. Furthermore, advances in materials fuel technological advances that often transform society in profound ways. For example, the discovery of the transistor in the 1950s fueled the semiconductor revolution and gave birth to the information technology era – a revolutionary advance that has transformed society in ways that were impossible to predict ahead of time. Due to its importance for many fields and applications, materials science and engineering is also one of the most heavily funded fields of research by the federal government, particularly by agencies such as the NSF, DOE, DoD, and to some extent NIH. As a result, many of the most significant discoveries of new materials and related technologies have their origins in research universities.

As a top-tier research university, OU aims to advance the field of materials science and its applications to and impacts on society. Through this BIC 2.0 opportunity, we wish to incentivize the formation of interdisciplinary teams of researchers across campus focused on the discovery of new materials, the understanding of their structure and properties, their application across the strategic verticals, and the development of new innovative technology solutions to societal challenges that require such new materials.

Theme 4: Enhancing knowledge at the intersection of technology and society to promote human flourishing

Emerging technological advances in areas such as medicine, information systems, e-commerce, artificial intelligence, and sustainable energy deeply affect human behavior and well-being. They also shape democratic institutions, local economies, and social ties. These innovations redefine how we communicate, learn, diagnose diseases, build communities, and interact with our environment. It is crucial that we harness these innovations for the greater good and mitigate potential negative and catastrophic unintended consequences. We are seeking proposals from transdisciplinary research teams that emphasize ethical, critical, legal, and social perspectives. Potential areas of focus could include exploring the inherent value of modern advancements, weighing risks against benefits, understanding implications for equity and accessibility, and confronting the broader societal and ethical considerations these developments bring. We envision teams spearheaded by individuals from diverse disciplines, ranging from humanists, social scientists, legal scholars and artists to designers, educators, and architects. These teams should partner with researchers from fields beyond the humanities, social science, and arts – particularly those in the physical sciences, engineering, and technology, to foster truly

transdisciplinary collaborations. Their collective goal would be to address the grand challenges posed by technology's direct impact on society.

It is understood that the above topics often overlap and do not exist in isolated silos and, as such, should only be interpreted as examples and a guide. This solicitation is open to creative “big” ideas that utilize transdisciplinary convergence to advance society across many other dimensions through convergence and transdisciplinary approaches.

Faculty are encouraged to be broad in their approach and to create transdisciplinary teams that truly cut across boundaries and tackle global grand challenges holistically.

The Application Process: Written proposals, Oral presentations and a proposed budget

Written proposals should not exceed three pages (single-spaced, 12-point font, Times Roman) and will be evaluated to select projects for an oral presentation. The written proposal should include:

- A brief executive summary that articulates the global grand challenge the proposal aims to impact, the proposal's Big Idea, and the potential impact of the idea.
- A brief description of the unmet need that the Big Idea tackles.
- What are the goals, expected outcomes, and impact on society of the project?
- Why now?
- A brief description of the team's approach to meeting the goals, including an articulation of the path to sustained external funding and how the approach leverages OU resources.
- A brief description of the benefits of the proposed solution to OU and the world.
- Why OU? Including a description of the competition in the field and possible partnerships.
- A set of milestones that will be met over the period of performance (not to exceed 24 months).

Other considerations include the following:

- The proposal must clearly identify a team leader and project champion (i.e., lead Principal Investigator) who must be an experienced (tenured or tenure-track) faculty member with a significant record of success in translating new ideas to extramural research support. Current VPRP-supported Center/Institute Directors are not eligible to serve as lead PIs. We encourage lead PIs from all disciplines to apply. **Previous PIs or co-PIs of BIC 1.0 projects are eligible to apply provided the project is clearly differentiated from and in no way a continuation of their BIC 1.0 funded project.**
- If possible, the proposal should identify **one or more partners** from a local, national, or global community to strengthen the system approach and societal impact.
- The milestones should set a clear **path toward federal, private, or industry funding** after the BIC 2.0 program ends. If selected for the BIC 2.0 program, the team will work closely with OU's

Washington, D.C.-based consultants ([Lewis-Burke Associates](#)) and with OU Advancement to find and create potential funding opportunities (federal, state, foundation, private, etc.) and develop a long-term vision for the research. OU's Center for Faculty Excellence will be able to assist in the preparation of extramural proposals.

- The milestones should set targets for **tangible progress** to be achieved and will be reviewed every six months for continuing funding.

Budgeting and Available Resources

A detailed budget request aligned with the milestones should also be included but will not count toward the three-page limit. It is expected that a typical project will have a budget of up to **\$150,000 in direct costs per year for up to two years**. However, final budget determinations will be made after selection based on final scope and schedule. Budget support will be provided by the OU Office of the Vice President for Research and Partnerships.

Cost-share that reduces the overall cost to the VPRP office of a project (and therefore allows for more projects to be funded) from colleges or elsewhere is not required but is highly encouraged and valued.

Continued budget allocation to a winning project will be contingent on satisfactory progress in meeting the biannual milestones. Projects that do not show sufficient progress against their milestones will be terminated prior to the two-year nominal performance term. No cost extensions beyond two years will be allowed.

Proposals should be submitted as a **single PDF** to <https://rb.gy/gx2eo>

Point of Contact for the BIC 2.0 program in the OVPRP: Dr. Ann West (awest@ou.edu).

Dr. West can facilitate pre- or post-award consultation of applicants with Lewis-Burke Associates or OU's Office of University Advancement and will coordinate with the Center for Faculty Excellence as appropriate.

Timeline (all dates are approximate and may be revised as needed)

- **Oct. 6 -20, 2023:** Dr. West will offer Zoom office hours or by appointment (TBA).
- **Oct. 9 -27, 2023:** CFE and the strategic OVPRP research institutes will lead team-building workshop(s) based on the themes described above.
- **Oct. 31:** Notice of Intent (*required*) due with project title, lead PI and coPIs (and their institutional affiliations); submit to awest@ou.edu
- **Nov. 30:** Written proposals are due by 5:00 p.m. Central Time
- **Dec. 18:** Notification for selection of oral presentation
- **Jan. 8-19:** Oral presentations
- **Jan. 30, 2024:** Notification of selected proposals for awards
- **Feb. 1:** Earliest project start date

Proposal Evaluation

Proposals will be evaluated by a team of selected OU academic leaders and external advisors representing the broad interests and capabilities of the campus. Care will be exercised to ensure diversity (disciplinary and otherwise) in the evaluation team and to avoid conflict of interest in the proposal evaluation process. The proposals will be scored based on the following weighted criteria:

40% - Is the team truly interdisciplinary, integrating multiple academic disciplines into a transdisciplinary approach that is bigger than the sum of the parts? To what degree is this truly a new collaborative research endeavor? What will be the potential societal impact of the project?

20% - How compelling is the Value Proposition? What intellectual value or contribution is represented by the idea? How strong is the scholarship/research base for the proposal? Will the project catalyze or enable new areas of research or new collaborations? Does the project aim to create solutions that are oriented toward diversity, equity, and inclusion?

40% - How likely is it that BIC 2.0 funding will result in new federal, corporate, donor and/or foundation funding at a significant scale? Identify likely funding sources as specifically as possible. Why is this team suited to lead this effort, and why is OU the right place for the project?

Teams whose written proposals are selected for oral presentation will be invited to present their Big Idea to the evaluation committee. The teams will compete in a public process akin to an entrepreneur's pitch to venture capitalists. Presentations will be strictly limited to 8 minutes, with an additional 7 minutes for questions, and are expected to succinctly, but clearly address all elements of the project, as well as describe the project team leadership qualifications, milestones and budget. Details on the presentation framework will be shared with the selected teams in time.

For further questions related to the BIC 2.0 program, please contact Dr. Ann West (awest@ou.edu). See BIC 1.0 awardees and projects at ou.edu/research-norman/about/Initiatives/inactive-programs/big-idea-challenge-1.