

NORTHEASTERN 2025: RESEARCH AND SCHOLARSHIP FOR IMPACT

THE CONTEXT: RESEARCH AND SCHOLARSHIP AT NORTHEASTERN IN 2015

Northeastern produces cutting-edge research based on strong disciplinary foundations and interdisciplinary collaborations, facilitated by our innovative applications-based research centers, organizational affiliates, industrial partners, and programs that foster use-inspired research designed to address society's grand challenges. We have been recognized nationally as an R1 Doctoral University – Highest Research Activity by the Carnegie Classification of Institutions of Higher Education, and we intend to prove that this is where we belong.

Academic inquiry, in the form of research, scholarship, and creative activity, permeates all aspects of the Northeastern enterprise. The traditional model of the isolated investigator working by him or herself, supported by his or her individual grant, in his lab or design studio, has given way to research centers with international collaboration, involving not only graduate students, but also undergraduates solving problems with significant worldwide application and relevance.

Engaging students to identify and solve problems through their own creative investigations is well-suited to Northeastern's experiential environment. International research partnerships, enabled by smooth and efficient network connectivity, supplement our aspiration to be a global player on the world stage.

THE VISION: RESEARCH AND SCHOLARSHIP AT NORTHEASTERN IN 2025

Northeastern in 2025 will appear clearly to the world as an institution of advanced research and scholarship. We will have a unique flavor to our research, having built on our long-standing themes of health, sustainability and security with new concentrations on evolving use-inspired grand challenges. We will be nimble, readily adopting to societal needs, and efficiently partnering with other academic institutions, industry, and government, across the United States and around the world. The barriers to efficiently conducting research: bureaucratic, administrative, legal, and financial will have been minimized with coordinated policy among department, college, and university, in part by taking advantage of high performance research management (rather than research administration) software. We will be a model of interdisciplinary collaboration, with a supportive environment for cross-cutting team projects and research centers, real incentives for faculty and students to avoid disciplinary silos, and specialized training for effective research team leadership, research fundraising, and research project marketing. We will have established a culture of research risk tolerance, with our researchers not being afraid of tackling unconventional or particularly challenging problems, and having administrative encouragement and support in doing so. Our research and scholarship will know few borders, taking advantage of pervasive networking and virtual presence. Northeastern will be a university that researchers and scholars across the world will want to come to, to be part of our dynamic environment of inquiry.

1. Unique Northeastern Research

Research in 2025 will be inherently interdisciplinary and will engage multiple stakeholder sectors working together to solve pressing societal problems. Northeastern's unique attributes continue to include its focus on use-inspired research and its entrepreneurial, problem-solving culture. Funding models and resources for our research will also be increasingly diverse, requiring agile adoption of new configurations that enable collaborative research partnerships.

University research in 2025 will be more distributed and less focused within a single physical campus. Northeastern will have broken down departmental silo barriers and disincentives to interdisciplinary collaboration within the university. This includes balancing our main research themes with investment in "vascular systems" that allow the flow of ideas and information across themes. Northeastern will compete within the top ranks of academia in engaging funders and collaborators, differentiating our research strengths and unique attributes and communicating these to external stakeholders and policymakers. External engagement will include university research leaders "at the table" in key stakeholder forums to articulate critical societal needs and position Northeastern as a research leader. Research results will be disseminated on shorter time scales than ever before, often at odds with lengthy peer review processes. Formal use of social media to share the fruits of our research will be the norm. Information sciences professionals (i.e., librarians) will have an ever increasing role to play in the circulation and production of humanities knowledge.

Northeastern will leverage its Boston location to amplify emerging strengths in urban planning and public policy, coastal resilience, sustainable urban systems, environmental health science, and biomedical and bio-engineering to solve the most pressing current and future problems.

2. Interdisciplinary Northeastern Research

In 2025 Northeastern will be a leader in establishing progressive standards that embrace interdisciplinary research, scholarship and creative activity. We will have many established Research Clusters or pods supported by modest university-level funding around concrete problems. These clusters bring together faculty and student researchers, as well as corporate and community partners from different disciplines, around a common issues of scientific or humanistic import, to facilitate productive discussions and collaborations, with a view toward the development of joint projects, conferences, publications, and grant applications.

Young faculty will be trained to form and lead teams, engage in team efforts, and be rewarded for team-based success. We will have developed new methods and metrics to assess interdisciplinary research by our faculty, recognizing that many of the advances in the future will occur at intersections between disciplines. Tenure and Promotion evaluation will incorporate updated procedures for interdisciplinary faculty, so that they can devote sufficient effort to learn new fields and develop partnerships and investigate areas that might not yet be well-regarded by traditional disciplines/journals. Northeastern will have removed the disincentives for junior faculty who collaborate outside of their departments and who take risks on potentially high-pay-off but unconventional research topics, and will have adopted a policy of unweighting tenure and promotion reference letters from more conservative reviewers who criticize interdisciplinary research effort.

Tenured faculty will be encouraged to take risks with their research endeavors by pursuing new interdisciplinary ideas as part of sabbaticals at home. Northeastern will have created a reward system that recognizes the value of publishing multi-disciplinary research. The Provost Office will help to identify prospective important multi-unit research topics and encourage NU students and faculty to form teams across colleges. Northeastern will be well-placed to benefit from the shifts in funding toward interdisciplinary research, but will strike an appropriate balance to ensure we have sufficient academic depth to go along with our breadth. Northeastern will have become a leader in establishing progressive standards that embrace interdisciplinary research, scholarship and creative activity.

3. Investment in Research Infrastructure

By 2025, all faculty and many students will have benefited from the nine year old Center for Advancing Research and Scholarship Through Learning (CARSTL). Based on Northeastern's successful teaching center, CARSTL will be a CATLR-for-Research entity focused on multi-level training, support, research development, research promotion and expanded internal funding programs for all researchers: junior faculty, grad students, undergrads, and would-be center directors. CARSTL contributes to Northeastern's culture of highly respected research, teaching proposal writing and reviewing, RFP evaluation, publication strategy, research team forming, and application of effective strategies to improve the competitiveness of their research applications. CARSTL also provides training for specialized expertise (e.g., statistical analysis, data visualization, scientific editing). A dedicated staff, supplemented with seasoned researcher mentors and advisors provide advice and support for the best possible training for the research enterprise. Researchers not only learn from their participation, but also receive incentives toward tenure, or class credit, or teaching release. Northeastern University in 2025 is setting the standard and raising the bar for research role models and pathways.

We will expand our Office of Research Development and create a University-Wide Interdisciplinary Research Council to help researchers identify targeted funding opportunities and

increase external funding throughout Northeastern. In addition, we will create a central Collaborative Research Exchange as a resource/application/ network to share research interests and facilitate research collaborations. More informally, Northeastern will establish and support social areas for faculty and students to communicate casually, sharing ideas and creative thoughts. Just as coffee breaks at professional conferences are opportunities for networking, building collaborations, and exploring solution paths, these areas can serve as affinity forums, with light discussions, comfortable furniture, and a relaxed but intellectual atmosphere.

Northeastern in 2025 will build on its long standing model of workplace education by establishing infrastructure for well-organized “co-op for faculty.” By spending half a year in targeted industrial positions, faculty will accelerate the impact of our academic research by being immersed in a business-oriented environment, learning how to transition their use-inspired research into practice and possibly commercialize it.

Northeastern will have Invested significantly in effective communication and content-driven networking initiatives among peers groups (student to student, faculty to faculty) and between levels (undergraduate, graduate, post doc, junior faculty, senior faculty, admins) around interdisciplinary themes. This includes state of the art web-based resources to identify research opportunities and potential research partnerships. Along with improved communication within the university, Northeastern will have much improved marketing and communication of research to the external community. Research breakthroughs will be announced quickly to the outside media through targeted contacts, which in turn will continue to build our reputation and encourage additional research partnerships and investments. Many of the traditional barriers to research have been reduced or eliminated by 2025. Although the final destination of any given research project may evolve over the course of the project, at Northeastern, the road leading to the goal is straight and smooth.

4. Engaging Northeastern Students in Research

By 2025, Northeastern will have streamlined the process of building multi-level diverse research teams that encompass faculty, postdoctoral fellows, graduate students and undergraduates. This is enabled using both a bottom-up and a top-down approach, with internal funding to encourage new student/faculty collaboration and to train students in specific lab/studio/field investigation fundamentals, and a university-level office to coordinate research opportunities for students on campus, along with funding or other incentives for faculty to spend time individually supervising these students. Similar to our co-op offices, this coordinating office will ensure that the opportunities are of high quality and at the appropriate knowledge level for student applicants, and that the students are appropriately prepared for the particular research experience. The office will generally promote research as an element of university education, identifying Research Experiences for Undergraduates (REUs) throughout the U.S., encouraging research-based co-op jobs, and running university-wide research opportunity fairs, similar to those run by the College

of Engineering in 2015. In 2025, every Northeastern undergraduate student would have the option of earning required class credit in his/her major by engaging in an individual research project, either on campus, or as part of a well-regulated research co-op. All graduating students will have learned how to write a research proposal, conduct theoretical, experimental, design-based, or library research, and to know what to expect from a research assignment.

5. Research Beyond the Campus

In 2025 much of Northeastern University's research will extend beyond the buildings of our Boston campus. As collaboration extends in teams that span the country and globe, enabled by second-nature video conferencing and immediate high-capacity information transfer, our research will have fewer and fewer borders. Northeastern will contribute to the shaping US and international scientific policy in areas of significant societal impact, such as the effects of global warming on marine life; safer, terrorist-resistant transportation and communication systems; and rapid prototype drug discovery. We will have developed a well-coordinated strategic plan for global research that encourages partnerships across countries.

Closer to home, we will have renewed our commitment to our Boston neighborhood and the rest of New England by fostering community-engaged research. We will address challenges by asking how we can help addressing community needs. We will have multi-faceted institutional support for building strong corporate, hospital, and industry partnerships for our use-inspired research. We will strengthen CRI to support the industry-university eco-system and align university's policies and processes with this vision.

Moving forward, two areas that the university embraces and emphasizes in its research, scholarship and creative activity themes are: a) social capital and b) creativity. The social and the creative permeate all of the university's fields, and by 2025, we will have taken a leadership role in the thinking, practices and protocols of these areas that will be essential to a just, resilient, global future.