The Interdisciplinary Healthy Aging Initiative

As lifespans lengthen, societies face unprecedented social, economic, and health challenges in caring for their aging populations. Potential solutions are complicated, but the most promising require adopting a healthcare system that is more proactive, more preventive, and patient-centered like never before.

Northeastern University is deeply vested in issues related to aging and the care of older adults. Currently, our Interdisciplinary Healthy Aging Initiative (IHAI) is positioning the university to lead efforts in transforming care for older adults. Initiated by Northeastern’s College of Science and Bouvé College of Health Sciences, this cross-disciplinary program also includes faculty members from the College of Engineering, the College of Computer and Information Science, the College of Social Sciences and Humanities, and the D’Amore-McKim School of Business. The IHAI brings together researchers, practitioners, technology leaders, payers, funders, and community and government representatives. Under the IHAI’s umbrella, these teams will explore proactive monitoring, prevention, detection, management, and treatment of the cognitive and physical ailments that reduce quality of life and raise healthcare costs in our aging population. They will work together to enable research and make recommendations for best practices and forward-thinking healthcare policy.

This initiative spans a spectrum of approaches, including personalized molecular genetics, computational modeling-based predictions, mobile health technologies, bioengineered devices, and lifestyle interventions. Rather than lifespan extension, these scientists, healthcare professionals, and other stakeholders will collectively target the human healthspan as their ultimate goal.

PREVENTION VERSUS CURE

Current medical practice is more reactive than proactive, meaning that people only tend to seek care when problems arise rather than pursuing preventive measures. This results in a challenging and costly healthcare environment, especially when it comes to older populations.

Northeastern seeks to change this paradigm, making prevention a focal point of healthy aging. The IHAI will employ recent advances such as cyber-physical systems in technology; computational modeling of patient states using sensor data; a theoretical understanding of the biology of aging; and proactive management of health conditions in the home. By integrating and building on diverse areas of expertise in aging that currently exist across multiple colleges and schools at Northeastern, we have an unprecedented opportunity to significantly improve the health and well-being of older adults.

While researching and implementing preventive care efforts are expensive, the price of not making advances in healthy aging is far costlier. Northeastern University seeks partners in philanthropy, industry, and government who understand the critical importance of undertaking efforts now to lead to major policy changes for the greater societal good. With the help of these supporters, the Interdisciplinary Healthy Aging Initiative can realize its full potential to become a tremendous force in bringing high-quality healthspan expansion to our aging populations.

WHY NORTHEASTERN

Northeastern benefits from a multitude of faculty members who are actively pursuing research related to biological, behavioral, and social aspects of aging and aging-related disease. To this end, the
university is poised to leverage our research strengths in areas required to build the Interdisciplinary Healthy Aging Initiative. Our internationally acclaimed faculty use a variety of state-of-the-art technologies—ranging from personalized genetic mapping to drug discovery, from computer-based modeling and imaging to bioengineering—to better define why and how we age. Their leadership includes the following topics:

- **Biology of aging.** Many faculty members across Northeastern are already investigating the molecular and genetic underpinnings of cell, tissue, organ, and organism aging. Their goal: to better define why we age; to more accurately predict aging-related changes in our bodies that lead to impaired physical or cognitive function; and to better manage the consequences of aging to improve quality of life and reduce healthcare costs. Our researchers are leading vital studies in neurological degeneration, behavioral changes, immunological dysfunction and inflammation, tumorigenesis and cancer, normal and premature menopause, musculoskeletal decline, diabetes and metabolic disorders, and loss of stem cell-supported tissue homeostasis.

- **Personal health informatics.** A cross-disciplinary program, personal health informatics enables computational approaches to preventive and proactive care. This field integrates state-of-the-art research and technology with health and medical science, and includes technological developments, mobile health, machine learning, and big data mining, among many others.

- **Clinical and intervention-based sciences.** Northeastern faculty members have a long history of evaluating and implementing lifestyle intervention—as well as rehabilitation-based approaches—to help seniors achieve a better quality of life, and to assist those who have experienced an aging-related illness or injury to return to a more active lifestyle. Further, our Consortium on Technology for Proactive Care facilitates research in the area of self-management and home interventions, helping researchers unfamiliar with these technologies use new sensor and communication techniques to improve interventions.

- **Cognitive and behavioral neuroscience of aging.** Northeastern has established itself as a premiere force in the fields of behavioral neuroscience and affective science, which not only bridge the broad disciplines of psychology and biology but also engage chemists, physicists, engineers, and computational scientists to more fully understand and manage changes in human neural circuitry, emotion, and behavior with age.

- **Population and global health sciences.** Faculty across Northeastern currently investigate epidemiological underpinnings, and the public health and policy implications, of population and global health aspects related to aging. This research includes the epidemiology of chronic non-communicable diseases, implications of maternal and child health on the aging process, social determinants of health (housing, employment, violence, and crime), the built environment, health disparities, health services, healthcare policy, and healthcare law.

Further, we use these data in two distinct ways: to more accurately predict the onset and basis of aging-related changes in our bodies that lead to impaired physical or cognitive function; and to better manage the consequences of aging as a means to improve quality of life and reduce healthcare costs.
• **Education and training.** In addition to developing innovative methods for predicting the risk for, monitoring the onset of, and managing mental and physical health issues associated with aging, the IHAI will work toward enhanced educational training for the next generation of scientists and healthcare providers to better respond to the growing needs of seniors and their caregivers.

**WHY BOSTON**

In 2011, Boston was ranked second nationally by the Center for Scientific Review as one of the “Best U.S. Cities for Seniors,” and in 2012 Boston was ranked fourth nationally on Milken Institute’s “Best Cities for Successful Aging.” However, while the Boston metropolitan area is now considered the largest research and development hub for biomedicine and biotechnology in America, institutions with a large-scale and committed programmatic focus on healthy aging are minimal to non-existent in the Boston area.

As seniors are the fastest growing demographic population in Boston, the need for improved healthy aging strategies is crucial to ensuring that older residents can fully enjoy the exceptional quality of life our region offers.

**FAR-REACHING POTENTIAL**

The IHAI has tremendous potential to advance healthcare through a coordinated and expanded research effort involving the active participation of faculty pursuing cross-disciplinary research projects ranging from cell biology to new models of care for older adults and their associated policy implications.

Northeastern University is strongly positioned to become a prominent global leader in the critically important area of preventive healthcare for our aging populations.