A premier interdisciplinary institute transforming health and health care delivery through research and innovation in technology, system design, leadership, digital health, and policy.

**THE VISION**

**HIGHLIGHTS 2017 - 2018**

- Awarded over $300,000 to 13 projects with 34 faculty from 29 departments across 10 BU Schools and Colleges
- Named 43 IHSIP Fellows from 26 departments across 10 BU Schools and Colleges
- The Social Innovation on Drug Resistance (SIDR) Program founded
- Rena M. Conti joins IHSIP faculty
In its second year, the Boston University (BU) Institute for Health System Innovation & Policy (IHSIP) has seen the growth of collaboration across BU in health related research. The 43 IHSIP Fellows named this year highlight the extent to which connections are being formed across schools and departments in service of innovative work. These fellows include faculty from 10 BU schools and colleges working on interdisciplinary projects in the health sector... and this is just the beginning.

Improving the health of citizens—while creating better access to healthcare, improving quality of care, and creating sustainable health systems—is an ongoing priority in the United States and many nations around the world. The last year has seen new partnerships in industry form to drive innovation, a recognition of how important innovation in the health and health care space is to progressive societies.

Digital technologies and big data analytics will spur innovation and disruption of conventional models established to deliver health care and will change the way we do research. The IHSIP has collaborated with the Hariri Institute for Computing and Computational Science & Engineering for a second year to sponsor the Digital Health Initiative (DHI). This program provides seed grants for interdisciplinary teams of investigators to do novel work in a broad range of fields from data analytics to predictive modeling to remote wearable sensors. This year the DHI brought special emphasis to use of artificial intelligence enhancing digital analytics and health related digital technologies.

The problems that affect health and healthcare around this nation and the world are complex and require new interdisciplinary research to define comprehensive solutions. The IHSIP operating model is designed to facilitate this process and therefore is very relevant to the future of innovation in healthcare and to Boston University. I am pleased to present this annual report.

Sincerely,

Jonathan Woodson, MD, MSS, FACS
Director, Boston University Institute for Health System Innovation & Policy
Driving Innovation in Health Care

The IHSIP focuses on five pivotal, interconnected domains that are central to driving innovation in health care.
IHSIP Programs & Activities 2017-18

Biomedical & Health Technology Development and Transfer

In 2017, the Institute began its activity studying and advancing the integration of the tools being rapidly developed by science and technology into the health system. Anand Devaiah was appointed as Director of the domain in November to lead these efforts and has had a productive 6 months, both in gaining a broader understanding of the opportunities at BU and in developing collaborations. In his role, Dr. Devaiah bridges the worlds of development and implementation, leading collaborations focused on improving value in the health system through technological innovations.

3D Printing Workgroup

The Institute brought together faculty from BU’s College of Engineering (ENG) and its Engineering Product Innovation Center (EPIC) with BU School of Medicine (MED) faculty interested in the clinical applications of 3D printing. Through quarterly roundtables and collaborative research, this group is exploring the many medical uses of this technology and how it can be integrated into the existing system to produce better care at a lower cost. This year, the Workgroup launched projects in education, simulation, and complex anatomic fabrication.

Enabling Data Science for Medicine

Faculty from Boston University’s Medical Campus, Hariri Institute for Computing and Computational Science & Engineering, and the Mass Open Cloud Initiative (MOC), were brought together to create a new platform and method for studying factors important in the development, progression, and treatment of cancer. This is an international partnership, with colleagues in India that engage basic scientists, clinical scientists, computer scientists, experts in data security, and experts in human subject research policy.

IHSIP and the Office of Technology Development (OTD) Intellectual Property Initiative

The Institute and OTD came together to examine BU Intellectual Property (IP) with a collaborative lens. The team identified IP within the BU portfolio that have high potential value for health care innovation—whether through its intrinsic properties or by repurposing to a health care application—but have not been able to progress towards the health care marketplace. This partnership has already reinvigorated applications in advanced wound care and engaged industry partners in the development of a new pneumococcal vaccination strategy.

Partnerships

Fostering cross-disciplinary research, the Institute partnered with BU ENG, the Engineering Product Innovation Center (EPIC), Innovate@BU, Office of Technology Development, Hariri Institute for Computing, and the Clinical & Translational Science Institute. Additional partnerships are being developed with the Food and Drug Administration, and the Mass Open Cloud Initiative.
Center Director Dr. Brian Jack led the CHSDI in an active first year. These efforts generated health system focused research and programs comprised of interdisciplinary faculty drawn from diverse disciplines housed in the IHSIP and across BU’s Schools and Colleges.

Research Awards

Building a Community-based Culture of Health Accelerator, a collaborative project engaging local youth in health care leadership, activism and research to catalyze the development of youth-driven health initiatives designed to promote a culture of health. Led by principal investigators (PI) Katherine Gergen-Barnett from the Department of Family Medicine (MED) and Linda Sprague-Martinez from the BU School of Social Work (SSW).

Innovations in End of Life Care, PI Suzanne Mitchell from the Department of Family Medicine & Palliative Care (MED) and collaborators Deborah Carr from the Department of Sociology in the College of Arts & Sciences (CAS), Nancy Ammerman (Sociology, CAS), and Judith Gonyea (Social Research, SSW) are developing best practice models of palliative and hospice care in order to bring high quality serious illness and end of life care to patients and their families.

End of Life Care Initiative

The IHSIP convened a group of faculty from across BU’s campuses to bring the interdisciplinary analytic, research, and leadership capacity of a major university to bear on the critical healthcare and social issues facing people at the end of life. By bringing together sociologists, social workers, physicians, and other experts, the group is developing a deeper understanding of the complex processes at play. In partnership with the Research Office, the Initiative’s well attended Research on Tap event brought the community of interest together to hear from a diverse group of 15 experts from across BU, including specialists in genetics, law, medicine, art history, and a range of other disciplines. The initial Director of the Initiative is Judith Gonyea (Social Research, SSW), and the initial Steering Committee consists of Drs. Judith Gonyea, Deborah Carr, and Suzanne Mitchell.

Human Resources for Health to Address the HIV/AIDS Epidemic in Lesotho

Human resources for health must be strengthened to address the HIV/AIDS epidemic throughout southern Africa. The IHSIP was instrumental in obtaining funding from the Dreyfus Health Foundation to train more than 400 health care workers from across the country of Lesotho in community based methods designed to strengthen the healthcare system of Lesotho.

Complex Care Fellowship

Health reform aims to improve quality while controlling cost, and success in large part depends on the ability to control costs for high utilizing patients. The IHSIP was instrumental in organizing the structures needed to initiate the first “complex care fellowship” program in collaboration with Boston Medical Center and the Commonwealth Care Alliance. The curriculum of this program includes clinical and policy work, mentored research projects on the topics related to complex care, and completion of a MSc in Health Services Research from BU School of Public Health (SPH).

Interprofessional Team-based Training

Health care of the future depends on the creation of team based models, but there is much to be learned about how best to train professionals to work in
such settings. The IHSIP has partnered with the BU Community Health Alliance of Medical Professionals (BU CHAMPS), a federally funded program designed to develop a collaborative curriculum and clinical program. This program is a collaboration among the BU MED, BU SSW, and the BU College of Health and Rehabilitation Sciences: Sargent College (SAR) led by PI Heather Miselis, Molly Cohen-Osher, Carol Mostow, and Lauren Scott from the Department of Family Medicine (MED), Janice Furlong (Clinical Practice, SSW), Susan White (Obstetrics & Gynecology, MED), and Stacey Zawacki (Health Sciences, SAR).

Hospital Throughput and Operations Research Group

The hospital of the future will be defined by continuous quality improvement and redesigning operational processes for efficiency. The CHSDI has brought together faculty from the Medical Campus and Charles River Campus to address hospital operations using Boston Medical Center as a laboratory. The resultant collaboration of clinicians and experts in operations and system design is producing work with the promise of increasing quality and efficiency of care while reducing cost. Key collaborators are Jillian Berry Jaeker and Anita Tucker from the Department of Operations & Technology Management at Boston University’s Questrom School of Business (Questrom) and Christopher Manasseh (Family Medicine, MED).

STRATEGIC HEALTH CARE LEADERSHIP

The IHSIP worked with several groups of healthcare practitioners and leaders to help prepare them for the new level of leadership the emerging challenges of the health sector demand.

Emerging Health Science Leaders

Co-sponsored with BU MED, Henry M. Goldman School of Dental Medicine (SDM), Questrom School of Business (Questrom), and the BU School of Public Health (SPH). This course responded to the need to develop enhanced leadership and management skills in medical professions targeted to become key academic leaders in health related disciplines. The 40 participants from across the medical campus received instruction in management and leadership, and had the opportunity to learn from senior leaders in the field, including Former Principal Deputy Assistant Secretary of Defense for Health Affairs, Dr. Karen Guice; Director of the Defense Health Agency, Vice Admiral Raquel C. Bono; and Harvey V. Fineberg Professor of the Practice of Public Health Leadership at the Harvard T. H. Chan School of Public Health and the Harvard Kennedy School, and former Assistant Secretary for Health for the U.S. Department of Health and Human Services (HHS), Dr. Howard Koh (pictured above).
The IHSIP continued to invest in the field of digital health, funding research and building collaborations.

The Digital Health Initiative (DHI)

The IHSIP and the Hariri Institute for Computing and Computational Sciences & Engineering experienced continued success supporting digital health research at BU through their jointly created DHI.

All 11 projects funded through last year’s Request for Proposals (RFP) made significant progress, with several publications and grant proposals emerging from the work made possible by the DHI.

The DHI received an enthusiastic response to this year’s RFP, which featured a special focus on the incorporation of artificial intelligence and machine learning approaches in the development, deployment, and assessment of novel digital health solutions. The DHI chose to support 7 projects, representing 21 individuals from 8 of BU’s schools.

- **Optimizing Machine Learning Capabilities to Support Young Adults with Intellectual and Developmental Disabilities’ (IDD) engagement in health-related behaviors**, led by PI Jessica Kramer from the Department of Occupational Therapy (SAR) in collaboration with Dora Erdos (Computer Science, CAS).

- **Characterization of Cognitive State from Signatures of Digital Data**, led by PI Thomas Perls from the Department of Medicine (MED) with Paola Sebastiani (Biostatistics, SPH), Stacy Andersen (Medicine, MED), and Stefano Monti (Medicine, MED).

**IHSIP Fall Conference 2017: Forces Shaping the Future of Health and Healthcare**

On Monday, October 16th, the IHSIP presented a day of discussion on the future of health and health care with support from IBM Watson Health. Panels of academic and industry leaders shared their insight into the current state of health care and the likely changes to the system caused by current trends.

This event concluded with an installment of the Massachusetts Competitive Partnership Speaker Series hosted by the IHSIP, the Rafik B. Hariri Institute for Computing and Computational Science & Engineering, and their joint initiative, the DHI.
**KidneyAI**, led by PI Vijaya Kolachalama from the Department of Medicine (MED) in collaboration with Vipul Chitalia (Medicine, MED), and Joel Henderson (Pathology & Laboratory Medicine, MED).

**Physical and Social Human-Robot Interaction for Fall Prevention and Gait Rehabilitation**, led by PI Rebecca Khurshid from the Department of Mechanical Engineering (ENG) with James Cummings (Emerging Media Studies, COM), Mina Tsay-Vogel (Communication, COM), Brad Manor (Medicine, Harvard Medical School), and Dr. Junhong Zhou (Medicine, Harvard Medical School).

**Misinformation Reduction in Patient-doctor Relationships**, led by PI Arshya Feizi from the Department of Operations & Technology Management (Questrom) with Anita Tucker (Operations & Technology Management, Questrom), and Jillian Berry Jaeker (Operations & Technology Management, Questrom).

**Autism Spectrum Engaged Cloud Technology (ASPECT) Hub**, led by PI Catherine Caldwell-Harris from the Department of Psychological & Brain Sciences (CAS) in collaboration with Wesley Wildman from the BU School of Theology.

**Predicting Patterns in Real-time Cognitive Performance in Neurodegenerative Disease**, led by Alice Cronin-Golomb from the Department of Psychological & Brain Sciences and Emma Weizenbaum (Psychological & Brain Sciences, CAS), with Daniel Fulford (Occupational Therapy, SAR) and Vijaya Kolachalama (Computational Biomedicine, MED).

**Digital Health Matrix: Options for 2020 and Beyond**

The IHSIP collaborated with N. Venkat Venkatraman, David J. McGrath Jr. Professor in Management at the Questrom School of Business, to create a conceptual model of digital technology-driven change in the healthcare sector.

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**The Opioid Crisis in America: A Conversation with the US Surgeon General**

The IHSIP welcomed the 20th Surgeon General of the United States, Vice Admiral Jerome M. Adams, and Massachusetts Commissioner of Health Dr. Monica Bharel to BU. During the event, Dr. Adams addressed the US Department of Health and Human Services’ current priorities and what the department and the current administration are doing to combat the opioid epidemic. Dr. Bharel provided comments on the opioid epidemic in Massachusetts and steps that the state has taken to address the public health issue. Following their remarks, IHSIP Director Dr. Jonathan Woodson moderated a discussion between the two and took questions from the audience. With a packed house, the event showed how dedicated the BU community is to finding evidence-based patient-centered solutions to this epidemic. The event was co-sponsored with BU SPH.

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*From left to right: Dr. Jonathan Woodson, VADM Jerome Adams, Dr. Monica Bharel*
Social Innovation on Drug Resistance (SIDR)

The IHSIP formed SIDR in collaboration with the Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator, or CARB-X. SIDR is an interdisciplinary program focused on the interaction of human behavior and drug-resistant infections. SIDR supports interdisciplinary faculty teams rooted in the social sciences to explore the behavioral components to the rise of drug resistance, which threatens to usher in a post-antibiotic era. Kevin Outterson of the BU School of Law (LAW) serves as the director of SIDR.

SIDR’s inaugural RFP produced a competitive field of applications, from which SIDR selected 4 interdisciplinary research teams to support. Fourteen BU professors from 7 BU Schools will work with 4 post docs on interdisciplinary projects applying social science to the problem of drug-resistant infections:

**Uptake of Rapid Diagnostic Tests for Infectious Diseases and Behavioral Factors Influencing Use: Development of a Behavioral Model**, led by Tamar Barlam from the Section of Infectious Diseases in the Department of Medicine (MED), in collaboration with Mari-Lynn Drainoni (Health, Law, Policy & Management, SPH), and Kimberly Shea (Epidemiology, SPH).

**Economics of Science, Innovation, & Project Performance**, led by PI Jeffrey Furman from the Department of Strategy & Innovation (Questrom), in collaboration with James Bessen (LAW), Iain Cockburn (Strategy & Innovation, Questrom), Megan MacGarvie (Markets, Public Policy, & Law, Questrom), and Michael Meurer (LAW).

**Identifying and Correcting Misinformation and Misuse of Antibiotics and Antimicrobial Resistance through Social Media Health Interventions**, led by PI Dylan Walker from the Department of Information Systems (Questrom), in collaboration with Belinda Borrelli (Health Policy & Health Services Research, SDM), and Jacob Groshek from the Department of Emerging Media Studies in the BU College of Communication (COM).

**Antimicrobial Resistance Due to Poor Medicine Quality in Bangladesh: Situation Analysis of Awareness, Practices and Policies Using a One Health Approach**, led by PI Muhammad Zaman from the Departments of Biomedical Engineering and Materials Science & Engineering (ENG), in collaboration with Veronika Wirtz (Global Health, SPH).

The Center for Military & Post-Deployment Health

Led by Dr. Glenn Markenson, BU MED’s Center for Military and Post Deployment Health (CMPDH) works to improve health outcomes for active-duty military, veterans, and their families.

The CMPDH and IHSIP are developing a portfolio of projects to support military medical capabilities to remotely detect and monitor medical and mental health conditions.
FACULTY

Rena M. Conti, PhD

The IHSIP and Questrom welcomed Dr. Conti in July 2018 as the newest member of their faculty. Dr. Conti is an expert on the financing, regulation and organization of medical care, with an emphasis on biopharmaceutical markets and oncology practice. Dr. Conti is a 2007 graduate of the Harvard University Interfaculty Initiative in health policy (economics concentration). She currently serves on the Government Affairs committee for the American Society of Clinical Oncology and is co-director of the economics working group for the Cancer Therapy Evaluation Program for the National Cancer Institute. Dr. Conti was previously at the University of Chicago, where she was an Assistant Professor of Health Policy in the Department of Pediatrics, section of hematology/oncology, and the Department of Health Studies.

Jayakanth “JK” Srinivasan, PhD

Dr. Srinivasan continued his research on the improvement of federal health systems care delivery and leadership, and led a number of new projects:

Predictive Health Analytics & Systems Research Group

Dr. Srinivasan led the development of this interdisciplinary group. Currently, they are pursuing two primary research topics: improving prevention of hospital readmissions for congestive heart failure and the use of machine learning to improve communication quality between care providers and care enablers (employers, family members, friends, etc.).

Partnerships

Dr. Srinivasan led several of the IHSIP’s partnerships. These include: providing middle and senior hospital leader education and mentoring on quality improvement with Boston Medical Center’s (BMC) Quality Improvement Hub, a new partnership with the nationwide Medical Technology Enterprise Consortium, and BMC’s departments of Internal Medicine and Psychiatry.

In addition, Dr. Srinivasan joined the Department of Defense’s task forces on managing health systems reform to integrate healthcare services across military branches and understanding systems to support the identification, treatment, and management of soldiers with suicidal behavior.

Education and Publishing

Dr. Srinivasan taught Healthcare Operations at BU SPH and designed a course on healthcare analytics to be taught at Questrom for the first time next year.

He looks forward to the publication of a case co-authored with a major insurer on population health management in community settings, and the Fall 2018 release of his new book, Building a Learning Mental Healthcare System.

“The Institute for Health System Innovation & Policy has provided a unique platform for expanding health system research initiatives across the entirety of Boston University, including the Charles River and Medical Campuses. It has brought together leaders from academia, industry, and government to address vital national and global health care challenges.”

KENNETH W. FREEMAN - Allen Questrom Professor and Dean, Boston University Questrom School of Business
LEADERSHIP

Jonathan Woodson, MD, MSS
Director, IHSIP

Dr. Woodson leads the BU IHSIP. He is a Larz Anderson Professor in Management and Professor of the Practice at the Questrom School of Business, and holds joint appointments as Professor of Surgery at the School of Medicine and Professor of Health Law, Policy, and Management at the School of Public Health. Dr. Woodson formerly served as Assistant Secretary of Defense for Health Affairs.

Mark Allan, MBA, MSW
Executive Director, IHSIP

Mark returned to BU after serving as founding Executive Director of the Max Institute for Healthcare Management at the Indian School of Business. Mark has a long history of executive positions in the healthcare industry, including building and leading the BMC HealthNet Plan, as well as senior academic and consulting roles.

Anand Devaiah, MD, FACS
Director, Biomedical & Health Technology Development & Transfer Domain

Dr. Devaiah is an Associate Professor in the Department of Otolaryngology — Head and Neck Surgery with joint appointments in Neurological Surgery and Ophthalmology at BU MED and BMC. He has worked closely with companies from startups to established enterprises, served as a Medical Officer and Fellow with the Food and Drug Administration in the Center for Devices and Radiologic Health as a part of the Ear, Nose, and Throat Branch, and is President-Elect of the Society for University Otolaryngologists.

Kevin Outterson, JD
Director, Social Innovation on Drug Resistance Program

Professor Outterson is Professor of Law and N. Neil Pike Scholar of Health and Disability Law at BU LAW, where he co-directs the Health Law Program. He is the Executive Director and Principal Investigator of Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator (CARB-X), a $500 million global partnership focused on supporting developers of promising new antibiotics, diagnostics, and vaccines that tackle the threat of untreatable bacterial infections.

Brian Jack, MD
Director, Center for Health System Design & Implementation

Dr. Jack is the former chair of the Department of Family Medicine at BU MED, has authored over 100 peer reviewed articles or book chapters, and is a nationally and internationally recognized expert and leader in primary care innovation. His research team has developed the “Re-Engineered Discharge” (Project RED)—adapted by the National Quality Forum as a national “Safe Practice,” and used in all states and in over 10 countries. Dr. Jack’s work also focuses on improving health disparities through the use of health information and technology. He has received numerous awards and recognitions, and in 2013 was elected to the Institute of Medicine of the National Academies of Science.

STAFF

Sarah George, MPH | Director of Administration, IHSIP
Dana Molt | Project Manager, IHSIP
Marie Vearling | Administrator, IHSIP
The Fellows program recognizes promising and accomplished faculty from across BU whose work and expertise has critical relevance for the health sector. These individuals create the opportunity for interdisciplinary research and innovation, and are a cornerstone of the IHSIP’s community.

**SENIOR FELLOWS**

- **Rhoda Au, PhD** (Neurology, Boston University School of Medicine)
- **Tamar Barlam, MD** (Medicine, Boston University School of Medicine)
- **Azer Bestavros, PhD** (Computer Science, Boston University College of Arts & Sciences)
- **Margrit Betke, PhD** (Computer Science, Boston University College of Arts & Sciences)
- **Belinda Borrelli, PhD** (Health Policy & Health Services Research, Boston University Henry M. Goldman School of Dental Medicine)
- **Debby Carr, PhD** (Sociology, Boston University College of Arts & Sciences)
- **Iain Cockburn, PhD** (Strategy & Innovation, Boston University Questrom School of Business)
- **Gerald Denis, PhD** (Medicine, Boston University School of Medicine)
- **Mari-Lynn Drainoni, PhD** (Health, Law, Policy & Management, Boston University School of Public Health)
- **Jeffrey Furman, PhD** (Strategy & Innovation, Boston University Questrom School of Business)
- **Judith Gonyea, PhD** (Social Research, Boston University School of Social Work)
- **Jacob Groshek, PhD** (Emerging Media Studies, Boston University College of Communication)
- **Janusz Konrad, PhD** (Electrical & Computer Engineering, Boston University College of Engineering)
- **Andrei Lapets, PhD** (Computer Science, Boston University College of Arts & Sciences)
- **D. Keith McInnes, ScD** (Health Law, Policy, & Management, Boston University School of Public Health)
- **Jordana Muroff, PhD** (Clinical Practice, Boston University School of Social Work)
- **Michael Otto, PhD** (Psychological & Brain Sciences, Boston University College of Arts & Sciences)
- **Ioannis Paschalidis, PhD** (Electrical & Computer Engineering, Boston University College of Engineering)
- **Anita Tucker, DBA** (Operations & Technology Management, Boston University Questrom School of Business)
- **Richard West, PhD** (Computer Science, Boston University College of Arts & Sciences)
- **Muhammad Zaman, PhD** (Biomedical Engineering, Boston University College of Engineering)
FELLOWS

James Bessen (Technology & Policy Research Initiative, Boston University School of Law)

Thomas Byrne, PhD (Social Welfare Policy, Boston University School of Social Work)

Theresa Ellis, PhD (Physical Therapy & Athletic Training, Boston University College of Health and Rehabilitation Sciences: Sargent College)

Daniel Fulford, PhD (Occupational Therapy, Boston University College of Health and Rehabilitation Sciences: Sargent College)

Katherine Gergen-Barnett, MD (Family Medicine, Boston University School of Medicine)

George Kasotakis, MD (Surgery, Boston University School of Medicine)

Arunima Krishna, PhD (Public Relations, Boston University College of Communication)

Deepak Kumar, PhD (Physical Therapy & Athletic Training, Boston University College of Health and Rehabilitation Sciences: Sargent College)

Honghuang Lin, PhD (Medicine, Boston University School of Medicine)

Suzanne Mitchell, MD (Family Medicine, Boston University School of Medicine)

Caroline Morgan, MD (Family Medicine, Boston University School of Medicine)

Abby Rudolph, PhD (Epidemiology, Boston University School of Public Health)

Kimberly Shea, PhD (Epidemiology, Boston University School of Public Health)

Linda Sprague-Martinez, PhD (Macro Practice, Boston University School of Social Work)

Mayank Varia, PhD (Computer Science, Boston University College of Arts & Sciences)

Dylan Walker, PhD (Information Systems, Boston University Questrom School of Business)

SELECT PUBLICATIONS


Looking Ahead

The IHSIP will continue to add to its portfolio of research and collaborators in support of advancing innovation in health care and health related research while advancing the One BU philosophy of an integrated and interconnected university. In addition, we expect to rapidly grow collaboration with external partners, which will add new dimensions to the research effort and create new research funding opportunities. These new partnership interests are both domestic and international, providing the IHSIP the ability to contribute to finding solutions for global health and healthcare related problems—and thus, define our true relevance and value.

Interested in collaborating?

Contact the IHSIP:

ihsip@bu.edu | www.bu.edu/ihsip