PRIME
Cohort 1

DIRECTED BY

Tuhina Neogi, MD, PhD
Richard Wainford, PhD
Sarah Bagley, M.D. – Description of Research

Opioid-related overdose deaths continue to climb at alarming rates – greater than 200% since 2000. Emerging adults (individuals aged 18-25 years old) are a key demographic in the opioid epidemic, and especially important to engage in treatment, as they account for increasingly high absolute and relative rates of fatal opioid overdoses. Emerging adulthood is a distinct developmental stage and so these treatment engagement efforts should be developmentally tailored. This application describes a 5-year patient-oriented mentored research and training plan to develop a behavioral intervention focused on engagement of high risk emerging adults to treatment after they present to the emergency department with a nonfatal overdose. The proposed intervention model is based on a motivational intervention to reduce overdose risk by improving self-efficacy in adults who have a history of recent nonmedical use of opioid analgesics. My career goal is to become an independent clinician investigator with an expertise in behavioral intervention development and testing for emerging adults with opioid use disorders. The specific aims of this application are to 1) quantify the time to addiction treatment or recurrent overdose for emerging adults who experience a nonfatal overdose, 2) use qualitative methods to inform intervention development for emerging adults who experience a nonfatal overdose, and 3) conduct a pilot trial to determine feasibility and logistics of the intervention. My educational objectives are to learn: 1) behavioral intervention development, 2) science of behavior change in emerging adults, and 3) clinical trial design. I have identified a well-respected mentoring team and a supportive environment to help me achieve my goals. The results from this work will position me to submit a R01 grant to conduct a fully-powered efficacy trial of an intervention to reduce overdose risk behaviors and increase treatment engagement among emerging adults with non-fatal overdose.

Angela Bazzi, PhD, MPH – Description of Research

I am a social epidemiologist focused on substance use and associated health harms including HIV and other infectious diseases. I am an Assistant Professor of Community Health Sciences at the Boston University School of Public Health and a Boston University Peter Paul Career Development Professor. My quantitative, qualitative, and mixed methods research seeks to (1) identify the behavioral, social, and structural factors that contribute to risk for and resiliency against the acquisition of HIV and other sexually transmitted and blood-borne infections, and (2) develop and implement prevention strategies for diverse populations affected by HIV and substance use including people who inject drugs (PWID), sex workers, at risk couples, and men who have sex with men. A key question in my research is how to adapt existing, effective HIV prevention approaches, including combination behavioral-biomedical strategies involving antiretroviral pre-exposure prophylaxis (PrEP), so that they can be responsive to the needs of PWID and other vulnerable populations affected by substance use. In pursuit of this question, I am currently mPI of a CFAR pilot study and PI of a NIDA-funded K01 (K01DA043412) investigating the underutilization of PrEP among PWID. The ultimate goal of this research to develop and evaluate a novel, community-based intervention to promote PrEP uptake and adherence among PWID in the U.S. Northeast. Related to my research, I teach courses on women and substance use, intervention development, and qualitative methods.
Traci Bethea, Ph.D. – Description of Research

My K01 career development award provides an opportunity to receive training in cancer survivorship and in molecular epidemiology. The initial focus for my K01 research will be on breast cancer in Black women in the Black Women’s Health Study (BWHS). The literature on cancer survival among Black women is sparse and health disparities in survival are large, e.g., breast cancer mortality is 42% higher in Black women than White women. My K01 research focuses on two modifiable exposures – aspirin/NSAID use and vitamin D status – that may influence breast cancer outcomes and considers potential interaction with genetic factors, which will be instrumental in identifying populations that may benefit from pharmaceutical intervention. During my K01 award, I will continue my research on breast cancer subtypes, ovarian cancer, and neighborhood socioeconomic status in African American women and will contribute to research endeavors in the BWHS. I also hope to continue collaborating with investigators on a study about endocrine disrupting chemicals and uterine fibroids in African American women. In the next few years, I want to develop new research directions to complement my K01 award. One such area is the field of sleep and sleep disturbances. Most sleep studies that include underrepresented populations are cross-sectional and/or have a small sample size. Still, sleep literature supports the idea that there are racial/ethnic and socioeconomic disparities in sleep health and sleep disturbances. Emerging evidence suggests that sleep may influence cancer incidence and prognosis, by influencing both biological and behavioral risk factors.

Sarabeth Broder-Fingert, M.D., MPH – Description of Research

Significant racial, ethnic, and socioeconomic disparities exist in access to diagnostic and treatment services for children with autism spectrum disorder (ASD). Because earlier access to ASD services improves long-term outcomes, delayed engagement with these services can be responsible for substantial morbidity. This pattern of health service break-down – delay in care, leading to preventable morbidity – exists in many sectors of the US health care system. One promising solution, which has been studied extensively over the past ten years, is patient navigation. Patient navigation is a lay-delivered case management strategy designed to reduce health disparities by helping vulnerable populations overcome psychological and logistical hurdles to care. Navigation has proven effectiveness in multiple disorders such as cancer and HIV, and early data support its use as a strategy to promote timely engagement with evidence-based services among children with ASD. However, despite navigation’s substantial effectiveness data, multiple studies demonstrate the attenuation of its impact, and variable success, when implemented in real-world practice. This “research-practice” gap – whereby effective clinical innovations fail to be adopted (or practiced with appropriate fidelity) within real-world clinical practice – is ubiquitous in healthcare; but it is particularly problematic for low-income and minority populations and the institutions that serve them. Furthermore, despite guidance to the contrary, few clinical trials proactively collect data on the complex patient, provider, and organizational factors that impact subsequent implementation of the clinical innovations being tested. As a result of this missed opportunity, implementation strategies are often arbitrary and prone to failure. Therefore, in this K23 application, I propose to use emerging techniques in the field of dissemination and implementation science to evaluate key implementation processes of patient navigation in the context of an ongoing, NIMH-funded, multi-site randomized controlled trial of a patient navigation system designed to improve access to care for low-income children with ASD (R01MH104355, Feinberg). The goal of this work is to elucidate factors that can increase the likelihood of rapid and sustained uptake of patient
navigation in diverse, real-world practice settings. My educational objectives are to gain training and experience in dissemination and implementation science through the following goals: to learn process mapping and analysis; to learn new qualitative methods; and to learn and apply a new quantitative technique - multilevel modeling. The research in this proposal builds directly on my prior work, which focused on using multidisciplinary teams to improve access to services for children with ASD and their families. I have identified an experienced mentoring team and a supportive research environment, which will ensure that I attain my immediate and long-term goals. At the end of the award, I will be position to develop a testable data-driven implementation strategy to promote the rapid dissemination and implementation of patient navigation to vulnerable children with ASD.

**Allison Dennis, Ph.D. – Description of Research**

In vivo Molecular Phenotyping of Breast Cancer: Globally, breast cancer is the most widely diagnosed cancer and most lethal cancer for women.1 Treatment advances have included therapies targeted to specific cancer sub-types, such as trastuzumab (Herceptin) for HER2+ tumors, with more in the pipeline.2-6 Histopathological assessments enable tumor typing, significantly informing the diagnostic staging of the disease and therapeutic decision-making, but this approach is fundamentally restricted to analyzing a sub-region of a tumor at one moment in time, i.e. the biopsied cells at the time of the biopsy. This limited view of the tumor obscures the complexity of the disease by masking heterogeneity within a single mass and disregarding phenotype switching in recurrent tumors and distant site metastases.7 The lack of spatial and temporal mapping of the tumor phenotype results in less effective treatment as targeted therapies are included or excluded in the treatment plan based on initial biopsy results.8

We have the potential to visualize the spatial distribution and prevalence of specific cancer-related biomarkers with targeted imaging agents. Novel optical tools could be used to molecularly phenotype tumors non-invasively, informing treatment decisions. In addition, cancer researchers could utilize optical imaging as a way to longitudinally study the molecular evolution of a tumor in animal models, thereby contributing to our understanding of tumor progression, phenotype switching, and treatment development. This requires tools to visualize multiple biomarkers simultaneously and repeatedly. To address this pressing societal need, we will develop a series of targeted optical probes specific to particular tumor phenotypes. By using exceptionally bright, NIR-emitting imaging agents, we will enhance tissue penetration depths, allowing for in vivo visualization of the molecular phenotype of tumors. In this study, we will develop optical contrast agents targeted to three breast cancer biomarkers: HER2, the cytokine receptor CXCR4, and folate receptor alpha (FAα). Furthermore, the development of fluorescent semiconductor nanoparticles free of all Class A and B toxic constituents generates the opportunity for eventual clinical use of these vivid fluorophores. This line of research could have a significant impact on how we see cancer, thus changing how we understand and treat it.
Maureen Dubreuil, M.D., M.Sc. – Description of Research

Maureen Dubreuil, MD is a rheumatologist and Instructor of Medicine at Boston University School of Medicine (BUSM) whose research is focused on spondyloarthritis (SpA), an inflammatory arthritis that can cause fusion of the spine, leading to limitation in spinal mobility with resultant substantial disability. Her long-term goal is to identify management strategies that maximize SpA patients’ satisfaction, function and quality of life, while minimizing adverse outcomes and costs. Dr. Dubreuil’s proposed research will assess SpA treatment from the perspectives of patient preference and cost-effectiveness on a societal level. This work will i) improve treatment decision-making in SpA through greater understanding of the value that SpA patients place on symptom control and medication side effects, and ii) establish the cost-effectiveness of available SpA treatments in the US. The work will include SpA patient focus groups to determine factors that impact medication choice, and discrete choice experiments to quantify and prioritize treatment attributes of greatest importance to SpA patients. A cost-effectiveness analysis will compare treatment strategies, incorporating American SpA patient-derived values. The proposed research will advance the understanding of SpA treatment costs and benefits from both the American patient and societal perspectives, and will impact both shared decision-making and treatment policy. The research and training plan will take place primarily in the Clinical Epidemiology Unit at BUSM, a highly productive NIH-funded section that has trained many successful patient-oriented researchers. Co-primary mentors, Tuhina Neogi, MD, PhD, and Elena Losina, PhD, MSc, will guide Dr. Dubreuil’s work based on their experience in conjoint analysis and epidemiology, and in cost-effectiveness, respectively. The training plan includes specific coursework and workshops in patient-reported outcomes and advanced cost effectiveness modeling, and participation in regular study calls with a group engaged in cost-effectiveness research. Dr. Dubreuil’s professional development will be enhanced through regular Faculty Development and Clinical Research seminars, as well as consistent meetings with the co-primary mentors and advisors. The proposed research and career development plan will provide Dr. Dubreuil with the experience and skills necessary to become a successful independent clinical researcher in rheumatology with a focus in SpA.

Deepak Kumar, PT, Ph.D. – Description of Research

I am a physical therapist with research expertise in musculoskeletal biomechanics (motion analysis, electromyography, mathematical modeling) and quantitative MR imaging (for morphology and composition of cartilage, meniscus, bone, and muscle). My research interests lie in understanding the relationship between functional loading, tissue health and disability in lower extremity OA; and using this knowledge to develop effective interventions for at-risk populations.
**Lewina Lee, Ph.D. – Description of Research**

K08 Project: Lifespan Effects of Biologically Embedded Stress on Health
Summary: The overarching goal of my K08 research is to improve understanding of how stress accumulation from childhood through adulthood contributes to poor health in later life. In a series of studies, my research team and I are examining abnormal acute stress response and multisystem physiologic dysregulation as factors that can explain the negative effects of cumulative psychosocial stress exposure on cardiovascular disease (CVD) and mortality in later life. We define cumulative psychosocial stress exposure to encompass one's experience of childhood and adulthood psychosocial stressors. This enables us to fully capture stress effects that accumulate over age. We use a multi-domain approach to define acute stress response as the short-term reactivity to and recovery from stressors in the cardiovascular, hypothalamic-pituitary-adrenal (HPA), and affective domains. We conceptualize multisystem physiologic dysregulation as an intermediate consequence of cumulative psychosocial stress exposure across the neuroendocrine, cardiovascular, metabolic, and immune systems; and an indication of cumulative biological risk.

The central hypothesis of this project is that, adults with greater cumulative psychosocial stress exposure are more likely to display a risky profile of acute response to stressors as they age. In turn, they are more prone to develop multisystem physiologic dysregulation, experience faster physiological decline over age, and ultimately, have greater risks for CVD and early mortality. We are testing this hypothesis using data from two large, longitudinal studies with survey data on cumulative psychosocial stress exposure, and longitudinal biomarker data on multisystem physiologic dysregulation, CVD, and mortality. Multi-modal, lab-based acute stress response data are also drawn from one of these studies.

**Marc Larochelle, M.D., MPH – Description of Research**

An estimated 100 million Americans suffer from chronic pain, and 5 to 8 million are prescribed chronic opioids for pain management. Overdose deaths due to prescription opioids more than quadrupled between 1999 and 2010, mirroring increases in prescription opioid sales. There is a dearth of evidence-based tools to support providers in the challenging task of balancing potential benefits with known risks of prescription opioid therapy. Guidelines commonly recommend urine drug testing (UDT) as a risk monitoring tool for patients prescribed opioids for chronic non-cancer pain. UDTs can identify misuse or diversion through detection of illicit or non-prescribed controlled substances or absence of prescribed opioids. However, UDTs are challenging to interpret, requiring detailed understanding of complex drug metabolism pathways, and data suggest physicians frequently err in UDT interpretation. Observational studies suggest between 31% and 55% of UDTs are consistent with potential misuse or diversion, but there are scant data on how providers respond to these UDT results. Development of effective risk mitigation strategies for patients prescribed opioids for chronic pain is a key priority for NIH/NIDA. The current proposal seeks to develop and validate a method to identify unexpected UDT results consistent with misuse or diversion using EMR data. We will use this method to characterize the rates of, predictors of, and clinical response to unexpected UDT results in a large cohort of patients receiving chronic opioid therapy. Finally, we will evaluate the acceptability and efficacy of a clinical decision support tool that includes interpretation of UDT results with or without clinical response guidance. Through the Mentored Career Development Award, the candidate will develop skills necessary for transition to an independent research career, including advanced training in research using large clinical databases, training in intervention and
Jesse Mez, M.D. – Description of Research

I am a neurologist with clinical training in aging and dementia and research training in biostatistics/statistical genetics and epidemiology. In 2013, I became an Assistant Professor of Neurology at Boston University (BU) School of Medicine in the BU Alzheimer’s Disease (AD) and Chronic Traumatic Encephalopathy (CTE) Center. The following year, I became Associate Director of the Clinical Core of the BU AD & CTE Center. My research seeks to understand genetic, neuropathological and clinical aspects of various forms of dementia. I have a K-23 Mentored Patient Oriented Career Development Award that seeks to understand the role of genetic and non-genetic factors in atypical clinical presentations of Alzheimer’s disease. Since 2014, I have led the clinical arm of Ann McKee’s Understanding Neurologic Injury and Traumatic Encephalopathy (UNITE) study, a U01 project examining the neuropathology and clinical symptoms of brain donors who have experienced repetitive head impacts (RHI), including investigating clinicopathological correlation in CTE. I also have ongoing projects investigating genetic and environmental risk factors for CTE.

Lauren Ng, Ph.D. – Description of Research

Background: Low- and middle-income countries (LMICs) have very few mental health professionals. Given the chronic nature of mental disorders, primary care clinics may be best positioned to address mental health in LMICs. However, little is known about factors that influence real-world service delivery, access, quality, and sustainability of mental health interventions in LMIC primary care. Researching whether and how mental health services can be feasibly and effectively delivered in LMIC primary care is a NIMH priority and a grand challenge in global mental health. Severe mental illness (SMI) is the most common form of mental illness seen in primary care clinics in LMICs, and is a top contributor to the burden of disease. People with SMI are at high risk of developing posttraumatic stress disorder (PTSD), which is associated with more severe psychiatric symptoms, functional impairment, and worse treatment outcomes. Specific aims: The current study proposes to develop and assess the feasibility, effectiveness and implementation of a psychotherapy intervention to treat PTSD in patients with SMI in primary care clinics in rural Ethiopia. Aim 1: To conduct semi-structured qualitative interviews with patients, caregivers, providers and community members (n=60) and one community advisory board (n=17) to identify clinically and culturally relevant characteristics of the population and characterize barriers and facilitators to intervention adoption, implementation and sustainability. Results will be used to assess the fit and development of the intervention; Aim 2: To conduct a mixed methods open trial to refine the intervention and explore initial treatment effects (n=23 patients, 23 caregivers); Aim 3: To conduct a mixed methods multi-stakeholder process evaluation to assess intervention implementation as measured by the RE-AIM implementation framework (n=23 patients, 23 caregivers, 35 providers). Candidate: This Mentored Patient-Oriented Research Career Development Award (K23) builds upon the candidate’s experience in trauma-focused global mental health research
in low-income countries. The candidate’s long-term career goal is to be an independent investigator of evidence-based interventions for PTSD and SMI in LMICs. **Training objectives:** The K23 provides training and mentorship in (1) the course, prevalence and treatment of comorbid PTSD and SMI; (2) health services research, including methods to evaluate how healthcare is delivered and accessed in Ethiopian primary care, and factors that might influence delivery of a psychosocial intervention for PTSD; and (3) implementation science methods to decrease “science-to-service” gaps in providing mental health care in LMIC primary care, including hybrid effectiveness-implementation trials. **Training activities.** Training will be achieved through mentorship by experts (Drs. David Henderson, Abebaw Fekadu, Charlotte Hanlon, Kim Mueser, and Graham Thornicroft), field-based experience in Ethiopia, formal coursework at Harvard and Boston Universities, and seminars, trainings, and conference and workshop attendance.

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**Samantha Parker, Ph.D. – Description of Research**

This proposed five-year career development period will be used for research and training activities that will give Dr. Samantha Parker the skills and experience necessary to become an independent investigator. Dr. Parker's long-term career goal is to apply the theory and analytical tools of life course epidemiology to the study of adverse pregnancy outcomes and risk of maternal cardiovascular disease. Building on a strong background in reproductive epidemiology and epidemiologic methods, Dr. Parker has proposed content area training in cardiovascular epidemiology and applied skills of statistical methods for life course epidemiology, including mediation analysis. She has also included training regarding social determinants of health to learn about individual-level and neighborhood-level social determinants as they relate to adverse pregnancy outcomes and cardiovascular disease. The training plan involves formal coursework, symposia and workshops, and didactic experiences and the establishment of a mentoring panel representing expertise in each training domain. The research aims are to investigate the association between adverse pregnancy outcomes and maternal risk of coronary heart disease in the Black Women’s Health Study, the largest cohort study of black women in the United States. An accumulating body of evidence on this topic exists in predominantly white populations, but there is a dearth of evidence among black populations, despite persistent racial disparities in CHD morbidity and mortality. The aims will also address mediation by clinical risk factors for CHD, including chronic hypertension and diabetes, and modification by life course measures of individual-level and neighborhood-level social determinants of health.

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**Tae Woo Park, M.D. – Description of Research**

Dr. Tae Woo Park, an addiction psychiatrist and Assistant Professor of Psychiatry at Boston University School of Medicine, with the necessary training to establish himself as an independent clinical investigator in the field of reducing the risks of prescription drug misuse. This KL2 award focuses on developing a distress tolerance (DT)-based treatment for benzodiazepine (BZD) discontinuation in patients receiving opioid agonist therapies (OAT). Assisting Dr. Park will be a local team of multidisciplinary experts in substance use disorder (SUD) research. Dr. Park’s primary mentor, Dr. Richard Saitz is an addiction medicine physician and expert in developing and testing combined psychosocial and pharmacological interventions for SUD patients. Co-mentors are Dr. Michael Otto, a clinical psychologist and expert in BZD discontinuation and DT-based psychosocial intervention development, Dr. Mari-Lynn Drainoni,
an expert in using mixed methods in SUD research, and Dr. Alexander Walley, an addiction medicine physician-scientist with extensive experience working with the OAT patient population. Dr. Park’s training goals will involve 1) developing expertise in qualitative research methods, 2) training in intervention development for SUD populations, and 3) enhancing research career skills including manuscript writing and gaining skills in grantsmanship.

Gina Peloso, Ph.D. – Description of Research

Dr. Peloso’s primary research focus is statistical genetics. She has contributed to the identification of common genetic variants through genome-wide association studies (GWAS) with complex cardiovascular traits, particularly with plasma lipid levels. More recently, she investigates the role of rare genetic variation in plasma lipid levels using exome sequencing and whole genome sequencing. Furthermore, she leverages genetic variants to answer clinical questions such as predicting risk for disease and whether specific biomarkers are causal. Gina is an active member in the Cohorts for Heart and Aging Research in Genomic Epidemiology (CHARGE) consortium and the Global Lipids Genetic Consortium (GLGC).

Kaku So-Armah, Ph.D. – Description of Research

HIV infected people are more likely to get heart attacks and similar kinds of heart disease compared to people uninfected by HIV. The reasons behind this disparity are unclear. This application seeks to understand whether the excess risk for heart disease is caused by the high levels of liver injury often seen in HIV. Identifying the role that liver injury plays may have important implications for our ability to predict who is at increased risk for developing heart disease and finding effective ways to reduce this risk.

Katrina Traber, M.D, Ph.D. – Description of Research

Utilizing flow cytometry based cell sorting of whole lung digests, we have demonstrated that by 6 hours of infection, myeloid cells, specifically neutrophils, are a major source of OSM in pneumonia. Since neutrophils are recruited to the airspace by OSM signaling, they are unlikely the initial source of OSM during pneumonia. We propose that a candidate cell type for this role is the alveolar macrophage, which is present in the alveolar space at baseline, and demonstrates an induction of OSM RNA at 6 hours of pneumonia. We are currently utilizing both in vivo and in vitro approaches to test the hypothesis that the cell type initially responding to the stimulus is the resident macrophage, and that recruited neutrophils provide a more sustained OSM response during pneumonia. To demonstrate whether alveolar macrophages are necessary to induce OSM during pneumonia, we plan to utilize clodronate liposomes to specifically deplete alveolar macrophages prior to E. coli pneumonia. To date, we have validated this protocol and demonstrated depletion of macrophages to about 15% of control mice. We are currently performing infection experiments in these mice and plan to measure OSM production at the protein and RNA level. In an in vitro model of OSM production,
we have isolated alveolar macrophages from uninfected mice and stimulated them ex vivo with both E. coli and LPS, and have demonstrated that these stimuli result in an increase in OSM RNA production. We are currently in the process of measuring OSM protein produced and released by these cells.

Hong-Phuong Vo, M.D. – Description of Research

Bronchiolitis is the most common cause of hospitalization for US infants, with >130,000 hospitalizations each year and a total direct cost of greater than $500 million; the mean age of hospitalization for these infants is 3 months. Notably, racial/ethnic minority infants are hospitalized at higher rates than non-Hispanic white infants. Children with severe bronchiolitis, as defined by the need for hospitalization, are at particularly high risk for developing asthma, and therefore represent an important population for which to target primary prevention efforts.

Despite earnest discussion by many researchers about the importance of preventing asthma, and growing support from many national organizations, including the NIH, there are, to our knowledge, no programs with empirically documented efficacy. To develop an effective asthma prevention program for high-risk infants with severe bronchiolitis, we must understand whether the index hospitalization provides a unique opportunity to deliver an intervention focused on preventing childhood asthma. We also need to better understand the actual modifiable risk factors underlying asthma development in this high-risk group of children. To date, much of the research has focused on viral etiology, virus-induced immune responses, and child/parental atopy status, all of which are difficult to modify with a public-health oriented intervention.

Emerging evidence suggests that early childhood weight gain trajectory may be an important modifiable risk factor. Thus, this proposal will explore whether early childhood adiposity is associated with incident asthma in this group of high-risk infants.

This proposal describes a two-year mentored research and educational plan that includes two innovative studies. The first is a qualitative study that will enroll parents of an infant hospitalized with bronchiolitis and will assess their motivation over time to make behavioral changes to potentially prevent asthma development. The second study will use data collected as part of the 35th Multicenter Airway Research Collaboration (Carlos A. Camargo, PI) to assess the association between weight gain trajectory in the first four years of life and incident asthma. A new method for growth analysis, the SuperImposition by Translation And Rotation (SITAR) will be used in models to analyze weight gain trajectories.

Monica Wang, Sc.D. – Description of Research

Dr. Monica Wang's program of research focuses on addressing racial/ethnic and socioeconomic disparities in obesity and chronic diseases and the design, implementation, evaluation, and dissemination of culturally-tailored programs and policies that promote healthy eating and physical activity among underserved children and families. Since 2006, she has been a part of several successful multidisciplinary teams leading initiatives to develop, implement, evaluate, and disseminate interventions that address obesity and related conditions among underserved children and adolescents through community settings. Skills and expertise include needs assessment, survey research methods, community-based research methods, intervention development, and program
evaluation. As an Assistant Professor in the Department of Community Health Sciences at the Boston University School of Public Health, she continues to develop expertise in childhood obesity prevention and health disparities research. She is Principal Investigator on a 5-year mentored research scientist development award (K01) from NIDDK to reduce sugar-sweetened beverage purchase and consumption among children and families through a culturally-tailored behavioral intervention. Her work aims to understand drivers of behavioral change at multiple levels and to design, implement, and disseminate interventions that promote healthy dietary and physical activity patterns among underserved children and families through community settings. She has a joint appointment as an Instructor at the Harvard School of Public Health, where she have taught graduate courses on the social determinants of health since 2010.

**Ji Yi, Ph.D. – Description of Research**

Colorectal cancer (CRC) is the second leading cause of all cancer death in the United States\(^1\), causing over 50,000 deaths per year. Despite the significant efforts of using colonoscopy as a screening and prevention tool (15-20 million cases per year), the improvement in mortality has been relatively modest due to a low efficiency that <7% of patients who receive colonoscopy and polypectomy yield screening-relevant neoplasia (advanced adenomas or early stage carcinomas)\(^2\). Thus more precise risk assessment to personalize screening is urgently needed. This is particularly important for population with familial or genetic predisposition to CRC. They have several-folds of higher risk comparing to average risk population, however, the yield of the colonoscopy is not significantly higher\(^3\), \(^4\). To address this need, we propose a novel biophotonics platform, combining advanced optical imaging techniques and human iPSC (induced pluripotent stem cells)-derived organoids (HIOs). We hypothesis that the chromatin ultra-structural properties and intracellular autofluorescence (AF), measured by optical imaging, can be phenotypical markers to detect the early cancer transformation from HIOs, and thus assess the risk for patients with familial or genetic predispositions.