

Epicenter

DEPARTMENT OF EPIDEMIOLOGY NEWSLETTER

Volume 5, Issue 5, December 2019



HARVARD
T.H. CHAN

SCHOOL OF PUBLIC HEALTH
Department of Epidemiology

SEMINARS AND SPECIAL EVENTS

SEPTEMBER 4 **Michael Mina, MD, PhD**
Assistant Professor of Epidemiology
Department of Epidemiology
Department of Immunology and Infectious Diseases
Harvard T.H. Chan School of Public Health

SEPTEMBER 11 **Sandro Galea, MD, MPH, DrPH**
Dean and Robert A. Knox Professor
Boston University School of Public Health

SEPTEMBER 18 **Daniel Levy, MD**
Professor of Medicine,
Boston University School of Medicine
Chief of the Population Sciences Branch of the
National Heart, Lung, and Blood Institute and
Director of the Framingham Heart Study

SEPTEMBER 23 **Amy Berrington de González, D.Phil.**
Branch Chief and Senior Investigator
National Cancer Institute
Division of Cancer Epidemiology and Genetics,
Radiation Epidemiology Branch

OCTOBER 2 **Ichiro Kawachi, MB.ChB., PhD**
John L. Loeb and Frances Lehman Loeb
Professor of Social Epidemiology,
Department of Social and Behavioral Sciences
Harvard T.H. Chan School of Public Health

OCTOBER 9 **Sebastian Schneeweiss, MD, ScD**
Chief, Division of Pharmacoepidemiology and
Pharmacoeconomics, Department of Medicine,
Brigham & Women's Hospital; Professor of Medicine, HMS
Professor in the Department of Epidemiology, HSPH

Jessica Franklin, PhD
Assistant Professor of Medicine, Harvard Medical School
Biostatistician in the Division of Pharmacoepidemiology
and Pharmacoeconomics, Brigham and Women's Hospital

OCTOBER 16 **Miquel Porta, MD, MPH, PhD**
Professor, Hospital del Mar Institute of Medical Research
(IMIM) and School of Medicine, Universitat Autònoma
de Barcelona

SEMINARS AND SPECIAL EVENTS . . .

OCTOBER 23

1:00–1:50PM

Kresge 502

Susan Redline, MD, MPH

*Peter C. Farrell Professor of Sleep Medicine, HMS
Senior Physician, Division of Sleep and Circadian Dis-
orders,
Departments of Medicine and Neurology,
Brigham and Women's Hospital;
Physician, Division of Pulmonary Medicine, Department
of Medicine, Beth Israel Deaconess Medical Center*

OCTOBER 30

1:00–1:50PM

Kresge 502

POSTDOCS “WORKS-IN-PROGRESS” SEMINAR SERIES

Jean-Philippe Drouin-Chartier, PhD

*Postdoctoral Fellow in the Department of Nutrition
Harvard T.H. Chan School of Public Health*

Benjamin Fu, PhD

*Postdoctoral Fellow in the Department of Epidemiology
Harvard T.H. Chan School of Public Health*

NOVEMBER 6

1:00–1:50PM

Kresge 502

Lies Lahousse, PhD

*Assistant Professor,
Department Bioanalysis, Ghent University
Visiting Researcher, Erasmus MC Rotterdam*

NOVEMBER 13

1:00–1:50PM

Kresge 502

John Quackenbush, PhD

*Henry Pickering Walcott Professor of
Computational Biology and Bioinformatics;
Chair, Department of Biostatistics
Harvard T.H. Chan School of Public Health*

NOVEMBER 20

1:00–1:50PM

Kresge 502

POSTDOCS “WORKS-IN-PROGRESS” SEMINAR SERIES

Lerato Magosi, PhD

*Postdoctoral Research Fellow
Center for Communicable Disease Dynamics,
Department of Epidemiology, HSPH*

Pamela Martinez, PhD

*Postdoctoral Research Fellow
Center for Communicable Disease Dynamics,
Department of Epidemiology, HSPH*

DECEMBER 4

1:00–1:50PM

Kresge 502

Timothy L. Lash, DSc, MPH

*Rollins Professor and Chair
Department of Epidemiology
Rollins School of Public Health, Emory University*

SEMINARS AND SPECIAL EVENTS . . .

DECEMBER 6 4TH CUTTER SYMPOSIUM ON EPIDEMIOLOGY,
ETIOLOGY, AND BIG DATA
1:30-3:30PM

Snyder Auditorium
Kresge G1

Alkes Price, PhD

*Professor of Statistical Genetics
Departments of Epidemiology and Biostatistics
Harvard T.H. Chan School of Public Health*

Andrew Beam, PhD

*Assistant Professor of Epidemiology
Department of Epidemiology
Harvard T.H. Chan School of Public Health*

Tianxi Cai, ScD

*John Rock Professor of Population and Translational
Data Sciences, Department of Biostatistics
Harvard T.H. Chan School of Public Health*

Caroline Buckee, D.Phil

*Associate Professor of Epidemiology
Department of Epidemiology
Harvard T.H. Chan School of Public Health*

DECEMBER 6 THE 170TH CUTTER LECTURE ON PREVENTIVE MEDICINE
4:00-5:00PM

Snyder Auditorium
Kresge G1

James Robins, MD

*Mitchell L. and Robin LaFoley Dong
Professor of Epidemiology
Departments of Epidemiology and Biostatistics
Harvard T.H. Chan School of Public Health*

DECEMBER 11 JOINT SEMINAR WITH THE DEPARTMENTS
OF NUTRITION AND EPIDEMIOLOGY
1:00-1:50PM

Kresge 502

Oscar H. Franco, MD, PhD, FESC, FFPH

*Professor of Epidemiology & Public Health
Director of Institute of Social and Preventive Medicine (ISPM)
University of Bern, Switzerland*

NEW FACES IN EPI



Hayley Arnold

Department Communications Intern

Hayley is a junior at Simmons studying Public Relations and Marketing Communications. In addition to her studies, Hayley is the Communications Director for the Simmons University Student Government Association, the Marketing Representative of the Simmons University Dance Company, and a Campus Ambassador for Undergraduate Admissions. In her spare time she enjoys dancing, eating out, and spending time with her family, friends, and 5-year-old miniature schnauzer.



Jenna Daniel

Program Coordinator (The HaSET Global Maternal and Child Health Research Program)

Jenna is a native Floridian and recent graduate of the Combined Degree Bachelor's/Master of Public Health program at the University of Florida, earning her Bachelor's degree in Microbiology and Cell Science and MPH in Environmental and Global Health. For her MPH practicum, Jenna spent this past summer working with

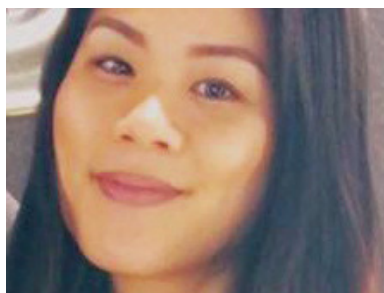
two BMGF-funded project teams at Haramaya University in Ethiopia, both focused on understanding the impact of *Campylobacter* spp. on children in rural kebeles. She is looking forward to continuing work based in Ethiopia as a new member of the HaSET team!



Sydney Grob

**Research Assistant II, Non-Lab
(PI: Lorelei Mucci)**

Sydney is originally from a small town called Evergreen, Colorado. Sydney recently graduated from Duke University where she studied biology and chemistry. Her previous research interests were in pediatric neuro-oncology but is so excited for the opportunity to understand cancer through an epidemiological lens. For fun, Sydney loves triathlons.



Denise Lee

Medical Records Specialist (Seage)

Denise is the medical records specialist for the PHACS protocol AMP Up Lite and Pediatric to Adult Care Transition (PACT) studies. She joins the team with a master's in social work from Boston College

and a bachelor's degree in Biology from Trinity College. In addition to her passion for social justice and research, Denise loves boxing, Muay Thai, and cuddling with her 6-pound Yorkie-Shih Tzu named Olive.



Rene Lepore

**Program Assistant
(PI: Elise Robins)**

Rene graduated from Plymouth State University majoring in Childhood Studies. For the past four years Rene has worked within special education in the middle school level in Hingham, Massachusetts. Rene's experience has been working with students with various disabilities, and specializes in Autism Spectrum Disorder. Rene has been an avid soccer fan and player since her youth and played at the collegiate level.



Nikita Mitish Mahulkar

**Interim Program Coordinator,
Center for Communicative Disease
Dynamics (CCDD)**

Nikita is currently serving as the Interim Program Coordinator for CCDD. Her educational background is a combination of Business and Ethnic + Gender Studies. She has

NEW FACES IN EPI . . .

worked primarily in the tech realm of the nightlife and entertainment industry; she previously held SEO and data analytics positions at Tablelist and Royale. In her free time, she is an avid painter and enjoys hiking and gardening.



Alyssa Pellegrini
Administrative Assistant (Jr. Faculty)

Alyssa is a recent graduate from Simmons University where she double majored in marketing and public relations with a minor in healthcare management. During her four years as an undergrad, she held internships at Harvard Chan School, Harvard School of Dental Medicine, several non-profits and a clean tech start up in the MassChallenge focused on clean water technology. For fun, Alyssa can be found cooking, baking, going to yoga class or exploring Boston with her two-year old Maltese puppy.



Mike Pyle
Research Assistant III, Lab
(PROMISE & Ironman Projects)

Mike was born and raised in Boston. He graduated from the University of Massachusetts Boston with a degree in biology. He previously worked at Harvard Medical School and is excited to be back in the Harvard

community, here at the School of Public Health in the Genotyping Core Facility. When he's not working, Mike enjoys outdoor activities from biking to running to hiking.



Zach Schwartz
Administrative Assistant, Program in Genetic Epidemiology and Statistical Genetics (PGSG)

Zach is a recent graduate of Brandeis University over in Waltham, where he specialized in Global Studies and received his B.A. and M.A. At Brandeis he also served as Assistant to the Director of the International & Global Studies Program. He is excited to be a resource for the dedicated trainees, faculty, and staff of the Department of Epidemiology as they work to make the world a healthier place. When not in the office, you can find Zach hiking on any mountain taller than 4,000 feet in New England, biking around Massachusetts, or with his nose buried in a book somewhere in Boston.



Sarah Unninayer
Program Manager, HaSET
(PI: Grace Chan)

Sarah is thrilled to join the HaSET team as a program manager. She comes to the Harvard School of Public Health from Jobs for the

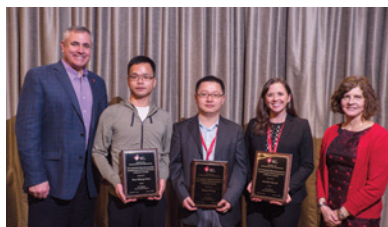
Future, a workforce development and education system reform organization. Sarah has a master's degree in Russian, Eurasian, and East European studies and a bachelor's degree in foreign service, both from Georgetown University. She has too many cats and loves to travel to places with delicious food or unique wildlife.



Kimi Van Wickle
Research Assistant II, Non-Lab (HaSET)

Kimiko Van Wickle recently graduated from Johns Hopkins School of Public Health with her MSPH in Global Disease Epidemiology. At graduate school, she primarily focused on mixed methods interventions in HIV prevention and control in Uganda and South Africa. She has a diverse research background that includes epidemiology and infectious disease research as well as qualitative work in medical anthropology. She hopes to bring this experience to the HaSET program in Ethiopia. Beyond her academic work, she enjoys learning new languages and exploring hidden green spaces in Boston.

DEPARTMENT UPDATES



Jennifer Stuart received a Trudy Bush Fellowship Award for Cardiovascular Disease Research in Women's Health from the American Heart Association's Council on Epidemiology and Prevention at the AHA EPI Lifestyle Scientific Session meeting in Houston, TX this past March. The award was related to her abstract "The Role of Aspirin in the Relationship Between Hypertensive Disorders of Pregnancy and Incident Maternal Cardiovascular Disease".

Tianyi Huang [center] who is an alumni of the Epidemiology doctoral program (currently Associate Epidemiologist, Channing Division of Network Medicine) was also a Trudy Bush awardee for his abstract "Actigraphy-Measured Sleep Regularity and Risk of Incident Cardiovascular Disease: The Multi-Ethnic Study of Atherosclerosis".



Doctoral Student **Hari Iyer** won the Lancet Best Student Poster at the March 2019 CUGH conference for "The Global Cohort of Doctoral Students: A Partnership to Build Global Health Research Capacity."



Edward Giovannucci was the recipient of the AACR–American Cancer Society Award for Research Excellence in Cancer Epidemiology. He delivered his award lecture titled "Diet, Physical Activity, Metabolic Health and Cancer Prevention," Tuesday, April 2, 2019, during the AACR Annual Meeting 2019 at the Georgia World Congress Center.



Caroline Buckee was the recipient of the 2019 Alice Hamilton Award and Lecture given each year by the Committee on the Advancement of Women Faculty (CAWF), at the Harvard Chan School. Launched in 2011, the Alice Hamilton Award and Lecture recognizes an especially promising junior woman investigator in public Health whose work has already made a significant impact. The lecture and ceremony were held on April 24, 2019.

Caroline Buckee was also honored as an innovator by Malaria No More for her work showing us that mobile phones are a public health tool.



In June 2019 **Prof. George Seage** and colleagues attended the CIPHER Collaborative meeting, an international collaboration of over a dozen Cohorts that have been merged into one Global Cohort consisting of over 180,000 HIV perinatally infected children. There are three collaborating data Centers, one at Harvard Chan (George Seage, PI), University of Cape Town (Mary-Ann Davis, PI) and University College London (Ali Judd). **Paige Williams** and **Kunjal Patel** are also involved in the CIPHER Collaborative and both were in attendance at the meeting in Baverno, Italy. The Epi Department also hosted two CIPHER Fellows for the month of June, **Amy Slograve**, and **Barbara Berman**.

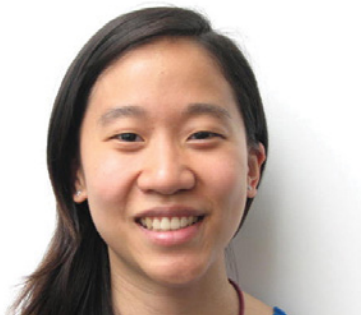


Alum **Dominique Heinke** received the 2019 Student Prize Paper Award from the Society for Pediatric and Perinatal Epidemiology Research (SPER) for her paper "Risk of stillbirth among fetuses with non-syndromic major birth defects: a population based cohort study." She received this award at the June 2019 SPER annual meeting in Minneapolis, MN.

DEPARTMENT UPDATES . . .



Kelsey Vercammen, a first year PhD student, in June 2019 was awarded a 3-year Canadian Institute of Health Research Doctoral Research Award. Kelsey's research project, supervised by **Dr. Eric Rimm**, is titled "A longitudinal evaluation of food insufficiency, cardiovascular disease risk, and obesity among adults living in the United States".



Joy Shi, a PhD candidate in the Department of Epidemiology at the Harvard T.H. Chan School of Public Health, is the recipient of this year's UCB Fellowship Fund. The fund is to support the training of fellows and students in methods for clinical research, with a preference for causal inference and artificial intelligence.



Claire Berman, PHACS Director of Health Education and Communication, and **Denise Jacobson**, Senior Research Scientist, were awarded the Lagniappe Award at the annual PHACS Fall network meeting in Bethesda, MD. The PHACS leadership created the "Lagniappe Awards" approximately ten years ago. Lagniappe simply means a "small gift" in Louisiana. This "small gift" is given as appreciation memento to PHACS members who have been nominated by their peers for their contributions within the PHACS Network.



Emma Accorsi, PhD candidate in Population Health Sciences, traveled to Berlin, Germany with the Huttenhower Lab to co-teach a week-long intensive workshop for PhD students and postdocs called "Metagenomics, metatranscriptomics, and multi'omics for microbial community studies." It was a scientific training course through Physalia courses for researchers of different levels (PhD students, postdocs, professors, industry) to learn new methods and emerging techniques in bioinformatics, and genomics. The students came from institutions in many countries.



Doctoral student **Arin Madenci** received an NIH F32 grant for project titled "A Contextual Approach to Understanding Operative Volume and Mortality." Faculty sponsors are Dr. S.V. Subramanian (Harvard T.H. Chan School of Public Health) and Dr. Zara Copper (Brigham and Women's Hospital).

GINGER PROGRAM UPDATE

NEUROGAP–PSYCHOSIS

Several members of the Epidemiology Department returned in April from a successful trip to Ethiopia as part of the Neuropsychiatric Genetics of African Populations (NeuroGAP) project's Annual General Meeting. Members of the NeuroGAP and GINGER teams were present, along with seven of the GINGER Research Fellows, who each shared their experiences as a Fellow and spoke on the impact and influence the program has had on their academic and professional careers.

NeuroGAP is a collaboration between the Harvard Chan School, the Broad Institute, and five institutions in Africa with very ambitious goals to expand knowledge of the genetic architecture of psychotic disorders in Africa through large-scale sample collection and analysis and to increase understanding of the genetics of African populations. The sample collection currently spans four countries with total collection goals of 17,000+ cases and 17,000+ controls through 2022. NeuroGAP is directed by Epidemiology Professor Dr. Karestan Koenen with additional leadership from Drs. Bizu Gelaye and Lori Chibnik. One arm of NeuroGAP is the NeuroGAP–Psychosis study which aims to recruit 35,000 participants from Ethiopia, Kenya, South Africa, and Uganda to better understand the genetics of schizophrenia and bipolar disorder.

This past year NeuroGAP–Psychosis reached three major milestones: After two and a half years of prep work and approvals from 12 ethics committees, recruitment at all five sites was launched in 2018. Since then, the study has recruited almost 15,000 participants. The US-based team has received DNA from all five sites, totaling more than 11,000 samples. The first 960 samples (192 from each site) have been genotyped with a success rate of 96.0%, and population analyses have been run on the DNA from all four countries.



Elizabeth Atkinson, Lukoye Atwoli, Bizu Gelaye, and Anne Stevenson celebrate NeuroGAP–Psychosis recruiting its 10,000th participant on July 22, 2019



Epi Dept staff Carter Newman, Rocky Stroud II, Jake Powers, and Anne Stevenson with the program managers from Ethiopia, Kenya, South Africa, and Uganda (April 2019)

VIRTUAL CLASSROOMS

GINGER wrapped up its second year of Virtual Classrooms in July. This year featured a number of notable guest lecturers as well as presentations by the GINGER Research Fellows on progress made on their respective group projects. Led by Drs. Lori Chibnik and Bizu Gelaye, faculty from the Harvard–Chan Epidemiology Department volunteered their expertise for sessions on systematic reviews, brain imaging, and sensitivity analysis. Thank you to Drs. Stefania Papatheodorou, Henning Tiemeier, and Tyler VanderWeele for their informative and engaging presentations! GINGER began its third year of Virtual Classrooms in September 2019.

ONSITE TRAININGS & SEMINARS

In February 2019, GINGER led a two-week training at the University of KwaZulu–Natal in Durban, South Africa, run in partnership with Prof. Bonga Chiliza and Senior Specialist and Lecturer Dr. Saeeda Paruk of the Discipline of Psychiatry. Topics covered epidemiology, systematic reviews, and meta-analysis, in addition to research methods and analysis in biostatistics and R programming. The course was led by Drs. Lori Chibnik and Bizu Gelaye of the GINGER Program, who were joined by Teaching Fellows Drs. Reem Waziry, Katrina Devick and Zachary McCaw (Harvard–Chan School Depts. of Epidemiology and Biostatistics), and Dr. Sali Farhan (Broad Institute).

GINGER PROGRAM UPDATE . . .



Dr. Isabel Fulcher assisting participants at the GINGER on-site training in Addis Ababa, Ethiopia



Dr. Reem Waziry facilitating study design working groups during the Epidemiology course at the University of KwaZulu-Natal in Durban, South Africa

ADDIS ABABA UNIVERSITY (AAU) SYMPOSIUM

GINGER hosted a one-day symposium on genetics research methods and grant writing at AAU in April 2019. The symposium immediately followed the NeuroGAP AGM and was led by Dr. Lori Chibnik and Drs. Elizabeth Atkinson and Alicia Martin (Broad Institute). The symposium was attended by over 30 PhD students and residents from the departments of psychiatry, pharmacology, public health, and microbiology.

GINGER recently concluded the program's fifth on-site training, which was held in Addis Ababa, Ethiopia from November 18–22, 2019. The one-week Interactive Biostatistics Workshop focused on introductory biostatistics and the use of R programming for statistical analysis, and was led by GINGER team and Epi Department members Dr. Lori Chibnik, Kristi Post, and Courtney White, in collaboration with NeuroGAP–Psychosis Ethiopia PI Dr. Solomon Teferra. Dr. Laurent Francioli (Broad Institute), as well as Drs. Isabel Fulcher and Katrina Devick (both recent HSPH graduates) joined as Teaching Fellows, and Dr. Girmay Medhin from Addis Ababa University supported with teaching efforts. Two GINGER Research Fellows from Ethiopia, Melkam Kebede and Abebe Hailu, were in attendance at the workshop and also led sections of the training on introductory biostatistics and R programming using the knowledge they had learned throughout the GINGER Virtual Classrooms.

NEUROMEX

NeuroMex is a large three-part collaboration between the National Institute of Psychiatry Ramón de la Fuente Muñiz in Mexico City, the Epidemiology Department at the Harvard-Chan School, and the Broad Institute of MIT and Harvard. Under the leadership of Dr. Karestan Koenen and Mexico PI Dr. Beatriz Camarena, NeuroMex is working to advance neuropsychiatric genetics research of psychosis specifically schizophrenia and bipolar disorders in Mexican populations through large-scale sample collection and analysis, capacity building along with Mexican collaborators and researchers. The study aims to recruit 4,000 controls and 4,000 samples for a total of 8,000 participants in the largest study of its kind in the country to date.

This past spring, the program hosted its first Mexico Leaders Meeting in Mexico City which brought together 20+ leaders from the National Institute of Psychiatry in Mexico City, as well as leaders from psychiatric and health institutions from the Mexican states of Queretaro, Campeche, and Guanajuato. Brena Sena, NeuroMex Program Manager, presented on the importance of including Latin American ancestry in both genetics and neuropsychiatric genetics studies, and the role of the NeuroMex program in achieving this goal, while Dr. Lori Chibnik, GINGER program Director, discussed the program's work to-date and expansion of training and capacity-building in neuropsychiatric genetics, epidemiology, and research methods to Mexico.

In the coming years, NeuroMex and GINGER will kick start training and capacity building efforts along with Mexican collaborators through support and funding by the David Rockefeller Center for Latin American Studies (DRCLAS) Mexico Innovation Fund at Harvard.



Dr. Beatriz Camarena, and leaders of all four NeuroMex sites, along with Dr. Lori Chibnik, Kristi Post, and Epi Dept staff Brena Sena during the first Mexico Leaders' Meeting in Mexico City, Mexico.



Dr. Pamela Morales from the National Institute of Psychiatry along with leaders Queretaro, León, and Campeche sharing on study collection instruments in Mexico City, Mexico.

THE DIMITRIOS TRICHOPOULOS MEMORIAL FUND

Honoring the Legacy of a Giant Among Giants in the Field of Epidemiology

THIS FUND honors the late Dimitrios Trichopoulos, past Chair of the Department of Epidemiology (1989–1995), and faculty at the Harvard T.H. Chan School of Public Health. Dr. Trichopoulos, a native of Greece, studied at the University of Athens Medical School, and later at the Harvard Chan School. An outstanding scientist and teacher for more than four decades in the field of Cancer Epidemiology and Prevention, Dr. Trichopoulos was the author or co-author of over 1000 publications (mainly research papers but also books, monographs, reports, reviews, commentaries, etc.), of which more than 800 are listed in international databases. He has done extensive original work concerning breast cancer etiology, mainly focusing on the early life origins of this disease. Among his many achievements he published the original paper implicating passive smoking in the causation of lung cancer. He also contributed to the elucidation of the etiology of hepatocellular carcinoma, the quantification of the association between psychological stress and coronary heart disease and the identification of several dietary and other important risk factors in the etiology of a number of cancers and other diseases.

By providing financial support, including assistance with tuition, stipends, and fees, to students within the



Department of Epidemiology at the Harvard T.H. Chan School of Public Health, this Fund honors the legacy of Dr. Trichopoulos' dedication to epidemiology, his kind spirit and altruistic views.

2018–2019 AWARDEES

not pictured: Jessica Lee



Anthony Gallanis, David Merola, and Brenna Kirk



Alexandra Sosinsky

FIFTY YEARS AGO . . .

Reflections on the Thesis Process

Fifty years ago, on April 15, 1969, esteemed epidemiologist Dr. Richard Monson submitted his thesis on “Peptic Ulcer in Massachusetts Physicians.” At the time, it was a close-knit group working under department chair Dr. Brian MacMahon who had a personal hand in picking Dr. Monson’s thesis topic. As Dr. Monson described it, Dr. MacMahon said that he had been thinking of doing a study on peptic ulcer and so Dr. Monson started working on the project as a master’s student and thought it was as far as it would go, but then Dr. MacMahon said “I thought this was your thesis.” From this thesis, Dr. Monson worked on a study that Dr. MacMahon had started on prenatal x-ray and the likelihood of childhood cancer. After a couple of years Dr. Monson got involved in a study with BF Goodrich and then got the impetus to look at occupational cancers as well as radiation cancers. His advice to current students is *don’t worry about what to do for your thesis as long as you can get it done in two or three years.*



Q&A WITH MICHAEL MINA

On July 1, 2019, the Department of Epidemiology welcomed Dr. Michael Mina as assistant professor. Dr. Mina comes to us from a clinical pathology residency at Brigham and Women’s Hospital and Harvard Medical School where he was Chief Resident in Pathology as well as a clinical research fellowship in the Department of Genetics at Harvard Medical School.



Can you tell us a little about your research background? What drew you to Public Health and specifically to the Harvard Chan School Epidemiology Department?

My research is largely at the interface of i) biological and laboratory work ii) epidemiology and mathematical modeling and iii) medicine and centers on infectious diseases, vaccines and tracking immunological responses. Starting back with my undergraduate research at Dartmouth College, which was a mix of biochemical engineering, microbiology and public health research, I have enjoyed the intertwining of disparate types of investigations. From the laboratory and medical perspective, having a firm understanding of statistics, epidemiology

and coding can feel almost like a super power — albeit one that an increasing number of people enjoy as research becomes increasingly collaborative

At the Harvard Chan School Department of Epidemiology, I found a strong precedent of research that falls within this general philosophy of cross-pollinating disciplines. My (now) colleagues work across many disciplines. In particular in the Center for Communicable Disease Dynamics (CCDD), where my lab is now based, investigators bring their mathematical and epidemiological backgrounds into their own labs and into collaborations with the closely aligned Department

of Immunology and Infectious Diseases, where I have a secondary appointment. By any metric, these strong collaborations have resulted in critical discoveries that influence public health and drive new research around the world. This was the type of collaborative, forward-facing and leading research environment I was looking to join.

Two additional distinct items drew me to the Department of Epidemiology: i) first and foremost, a warm and collaborative environment for students and

Q&A WITH MICHAEL MINA . . .

post-docs; and ii) a clear interest and willingness (particularly from our Chair Bert Hofman) to build increasingly strong ties with our neighboring institutions: Brigham and Women's Hospital/HMS, where I continue to wear my MD hat as an Associate Medical Director of Clinical Microbiology, specifically in molecular virology in the Department of Pathology.

Combined, my anticipation is that building a lab and research program in the Department of Epidemiology will provide ample room to grow as an investigator, as a physician, a mentor, and as an expert in my areas of research.

You have stated that your current research goals fall under four major areas of investigation where you see the lab going:

- Understanding the immunological and population-level consequences of measles infections and vaccines
- Reconstructing past epidemics through high-throughput profiling of immune memory
- Understanding development of immunity to infectious diseases in early childhood
- Elucidating the broad heterologous benefits of vaccination

What drew you to these questions? What plans do you have for your lab when you start in your new role here?

My research centers on infectious diseases and vaccines and is tied by a common interest to bridge biomedical and laboratory work with epidemiological or mathematical models to address important public health questions. Vaccines are interesting not only for their direct importance to public health but also because they can be viewed as massive ecological experiments that provide unique windows into how human pathogens interact. By manipulating immunity through vaccination and in turn altering pathogen distributions, we have an opportunity to observe how the dynamics of other pathogens and infections change in response, and these offer new insights into the pathogen-human-pathogen interface. Ultimately, these types of observations can help uncover broad effects that wouldn't usually be captured in traditional vaccine evaluations, despite potentially huge 'off-target' effects (for example an effect of measles or BCG vaccines to improve survival from all other infectious diseases).

Understanding these effects requires new biological and mathematical approaches and a lot of my work centers around development and applications of technologies for extremely high-throughput serology — where we simultaneously evaluate tens of thousands of immunological antibody responses in a blood sample. This magnifying

glass on antibody memory, ultimately provides incredible windows into infectious disease dynamics that we can exploit for public health research — in my case surrounding 'off-target' vaccine effects and evaluations of the landscapes of immunity and infectious diseases.

What are you most excited about in your new role here in the Epi dept?

There are just too many interesting and puzzling questions and with each discovery the number increases exponentially. In light of this, I'm most excited to develop a research program and lab group that enhances the discovery and the questioning process in a way that I could not do on my own. I hope and expect that interactions with and between post-docs, students and many fantastic collaborators at HSPH and elsewhere will inevitably result in better research. I'm excited to facilitate some of these interactions and to see what amazing new things we can learn and how we can apply them to improve health.

Outside of the science itself, I am genuinely excited (and a bit nervous) about building up a lab from scratch that is fun and enjoyable for all (or realistically most) of the members and that becomes known for being collaborative and open and provides an environment — especially for younger researchers — to grow and learn about what they do and do not love to do. That's one overarching non-science goal, and I am excited to see how it works out.

Is there anything else that your colleagues may not know already about you that you can tell us?

Well, I'll answer with some basics. I live with my partner Sarah, we recently bought a house just down the road in JP, near the pond. Sarah's an artist and producer — her artwork in Boston is mostly food & restaurant photography, so if you are a foodie and peruse restaurant websites or Boston Eater website, you'll likely see some of it. I'm also an artist on occasion — pottery, charcoal drawing, and origami — and recently Sarah and I have been building furniture — we made our couch from scratch! (*FYI: I'm not sure I'd recommend it*). I have an identical twin and we have three older siblings, one of whom many think may as well be a triplet. I expect that they will be visiting from time to time, and I'm sure I'll bring them around to meet people and see the school. So you might at times see someone that looks like me but is not, and although we are quite used to it, it can be awkward if you do not know.

Finally, my door is always open and I am very much looking forward to meeting everyone at HSPH and am very excited to be here.

Q&A WITH ANDREW BEAM

On July 1, 2019, the Department of Epidemiology welcomed Andrew Beam, PhD as assistant professor, with secondary appointments in the Department of Biomedical Informatics at Harvard Medical School and the Department of Newborn Medicine at Brigham and Women's Hospital. Learn more about Dr. Beam and his research plans in the following Q&A.



Can you tell us a little about your research background? How did you get started in your current field?

First, it's probably worth defining what I consider to be my primary field, given the somewhat circuitous path my academic journey has taken. I am principally concerned with improving, streamlining, and automating decision-making in healthcare through the use of quantitative, data-driven methods. The name applied to this activity will vary greatly based on with whom you are speaking. Computer scientists will call this artificial intelligence (AI) and/or machine learning, statisticians will call it regression analysis, and epidemiologists frame this problem in terms of causal inference. These communities come at this core problem of decision-making and reasoning using data with different tools and different assumptions, but it is my belief that fundamentally we are all working on very similar things. However, despite these shared interests, these communities remain largely isolated, and either relearn or are unaware of advances going on in their sister-disciplines. I am of the belief there is an extremely rich intersection between the various tribes of "data science" and this intersection is currently under-explored. I am excited to see what new ideas are created as these communities begin to cross-pollinate with one another, and I consider working at this intersection to be central to my new role here in the department of epidemiology.

Given that context, my interest in these questions began when I was a computer science and engineering undergraduate and I took an introductory AI course at N.C. State University. The idea that you could instantiate principles of intelligence in software was something that I found immediately exciting, as were the ethical and philosophical issues inherent to AI. In a piece of advice that I'm still grateful for today, one of my computer science professors advised me to strongly consider getting

some significant exposure to statistics as part of my graduate training. This was around 2007-2008, and I think he could see the data-tsunami just beginning to crest. His advice was prescient, and I ended up getting a masters degree in statistics while doing research at the US Environmental Protection Agency in Durham, North Carolina. I finished up graduate school in bioinformatics and computer science, where I wrote my dissertation on machine learning methods for genome-wide association studies, so I felt like I had come full circle.

My interests in healthcare and medical decision-making also developed while

in graduate school. My wife was a medical student at the time, and watching her complete her training was eye-opening for me. I had taken for granted that most medical decisions were evidence-based and made by physicians who had access to state-of-the-art technical tools. This fiction quickly dissolved once I had an "insider's" view of the healthcare system and, as it turned out, none of my preconceptions about medicine were true! Many decisions in the hospital lack a solid evidence base and technology is often an impediment for physicians, not an enabler. This was an extreme moment of clarity for me. I decided that I could explore the ideas in AI, machine learning, and statistics that I found so energizing while applying these methods to healthcare to address some very important societal problems. What could be more exciting than that? At this point, the last piece of this puzzle I was missing was some actual expertise in healthcare and medicine. I was fortunate to have the opportunity to do a post-doctoral fellowship with Zak Kohane at Harvard Medical School where I gained knowledge about the particular challenges posed by healthcare data, along with a healthy spirit of insurgency to improve the status quo that anyone who knows Zak will recognize.

What questions/problems are you working on that you are most excited to explore?

We are in the midst of the so-called "deep learning revolution," which has changed fields like computer vision and natural language processing, and is now beginning its assault on healthcare. Even though these models still leave something to be desired (more on that below), I

Q&A WITH ANDREW BEAM . . .

think that there are many problems in healthcare that these algorithms can help us with today. One area that I'm particularly excited about is the neonatal intensive care unit (NICU). The NICU cares for preterm infants (babies born before 37 weeks of gestation) and, in my opinion, is a wonder of modern medicine. What's more, NICU infants are data generating machines! All of the data modalities on which deep learning has been so successful, e.g. imaging, text, time series data, etc. NICU infants generate in spades. Using some large sources of NICU data and with the help of clinical collaborators, I'm working to develop predictive models of NICU patients.

Moving forward, I am really excited to widen my methodological aperture and think how we might improve machine learning algorithms to allow them to be both more capable and more robust. Even though they have performed some impressive feats, current deep learning approaches actually have a pretty impoverished model of the world. As my friends in statistics and epidemiology are quick to remind me, all deep learning is doing is extremely fancy curve fitting and input-output mapping. That is of course true, but the surprise for many of us has been just how many "hard" problems (like reading an x-ray) can be solved by highly complex but still quite dumb pattern matchers. However, there are classes of problems that are not solvable by current deep learning approaches, even in principle. Moreover, at least in its current framing, nearly all of modern machine learning techniques are designed to give predictions, but what doctors often want are decisions.

Many problems of this type are ones that come up in medicine routinely. Bringing it back to the NICU, a typical question a clinician might face is "If I extubate this baby, what will happen?" This type of causal question is not something that even the best deep learning model can answer. Obviously, the causal inference group here in the department is world-class and have spent decades thinking about this very sort of question. Working with and learning from these folks to understand how we might enable machine learning models of the future to answer this type of question was one of the key reasons I was so excited to join the department.

Seeing how you came from such a diverse academic background (with degrees in computer science, engineering, statistics & informatics), what draws you now to public health and to your new role in the Department of Epidemiology? What linkages do you see between AI, machine learning, and big data with medicine and public health?

I partially answered this in the previous question, but I strongly believe that these kinds of approaches (both machine learning and traditional statistical methods), can fundamentally change healthcare and public health for the better. So, at least for me, the link with public health and medicine is crystal clear. For the vast majority of people, healthcare is inaccessible (not enough time with their doctor) and unaffordable. The current healthcare status quo is unacceptable and unsustainable, so something must change. It may sound quixotic, but I sincerely believe that the work we are doing is part of the solution.

What plans do you have for the first few years of your new role here at the Harvard Chan School?

The first few years will be probably occupied by the typical activities of starting a new lab: writing as many grants and papers as possible! Beyond that, I really do hope to facilitate new kinds of collaborations between the different communities of healthcare data scientists. I am excited to learn from my new colleagues in the epidemiology department and at the school of public health more broadly.

Can you tell us one thing that colleagues may not know already about you?

Like the other newest member of the Epidemiology Faculty, Michael Mina, I also live in Jamaica Plain near the pond! My wife and I just welcomed our first daughter into the world at the end of July, so it's been a pretty busy couple of months. Outside of raising our daughter, I am very fortunate to collaborate with my wife on many of my NICU projects, as she is in the last year of her neonatology fellowship at Boston Children's. She has been amazing at helping me understand the challenges faced by physicians and keeps the machine learning projects we work on firmly grounded in clinical reality.

SUMMER PROGRAM IN EPIDEMIOLOGY

Every summer, the Summer Program in Epidemiology hosts undergraduate students from all over the U.S. to provide them with an understanding of the skills and processes necessary to pursue a career in public health. Learn more about the students who participated this past summer.

Chrystal Barnes is a non-traditional student who grew up in Washington state. She left to pursue an education in health after working in the health and fitness industry and seeing how complex and poor many people's health was, something she witnessed in her own family too. She recently graduated from Portland Community College (PCC) with an A.S. in Health Studies. She also left PCC having run multiple student organizations and projects related to health. She is

now finishing her bachelors at Portland State University, majoring in Public Health, while working at the Student Health Center and a research lab. Her long term goals include graduate school, research, teaching, and community work. Chrystal is passionate about health equity and the social determinates of health in relation to chronic disease.

Shae Gantt is a 3rd year student at the University of South Carolina Beaufort in Bluffton, SC where

she majors in mathematics and computational science. From the Epidemiology Summer Program she learned about the research process, graduate school, and also took classes in Epidemiology and Biostatistics. Shae had the opportunity to work with her mentor Dr. Carmen Messerlian, whose research looks at how paternal smoking impacts the child's neurological behavior and learned about the ins and outs of conducting research. This work showed her how she



L-R: Diana Acosta Valle, Sam Tracy, Kinnary Shah, Camille Samules, Carson Peters, Shae Gantt, Tiffany Lemon, Chrystal Barnes, Chinelo Njubigbo, and Cammie Lam (front).

SUMMER PROGRAM IN EPIDEMIOLOGY . . .

can use her math and computational science skills in public health research while also teaching her new skills like how to write impactful abstracts and effectively present data.

Cammie Lam is a NIH-BUILD research scholar pursuing a Bachelor of Science in Health Science and a double minor in Sociology and Japanese at California State University, Long Beach. During her time in the 2019 Summer Program in Epidemiology at the Harvard T.H. Chan School of Public Health, Cammie gained epidemiological research experience and participated in courses and training for R, epidemiology and biostatistics. Under the mentorship of Lorelei Mucci, Claire Pernar, and Benjamin Fu, she was involved in a study examining pre-diagnostic levels of metabolite HMDB05396 and risks of advanced prostate cancer.

Chinelo Njubigbo is a junior at Wayne State University in Detroit, MI, studying Public Health with a minor in Global Studies. Chinelo's research interests focus on health disparities in maternal and infant health, reproductive health, and environmental health. As a National

Institutes of Health BUILD Scholar, she has had the opportunity to engage in research projects that work on public health interventions in Detroit, MI, during her undergraduate years. Through the Summer Program in Epidemiology, Chinelo has learned new public health methods and strategies that will help her in her future career.

Carson Peters is a senior at Grinnell College, where she was awarded a full-tuition scholarship, and majors in the biology of global health. She recently studied abroad in Brazil, India and South Africa, in an honors global health program, and focused on infectious diseases including TB, HIV/AIDS and Zika. Her experiences abroad inspired her to conduct her senior thesis on cancer as a global health disparity with a special focus on breast and cervical cancers. During the Summer Program in Epidemiology at Harvard, Carson conducted research related to fertility intentions among transgender patients in the context of surgical transition as well as analyzed factors and barriers related to fertility preservation. Her experiences this summer have concretized her desire to pursue a Ph.D. in epidemiology.

Camille Samuels is a junior at Haverford College where she is studying Environmental Studies with minors in Africana and Health Studies. Because of this, she is interested in the impact of social determinants on health outcomes and especially the impacts and differences in health outcomes in various social contexts. She plans to use this framework to further explore health disparities among minorities in the United States and across the diaspora.

Kinnary Shah is a junior at the Rutgers University Honors College, pursuing a double major in Biomathematics and Public Health. Kinnary is a research assistant in the Ellison Lab at the Rutgers University Department of Genetics, where she uses bioinformatics processes to analyze epigenetic methylation in *Drosophila melanogaster*. During her time at the Harvard T. H. Chan School of Public Health, she worked on a research project with Dr. Elise Robinson studying the effects of parental education levels on the severity of autistic symptoms in children with autism spectrum disorder.

Diana Acosta Valle [no bio]



HARVARD
T.H. CHAN

SCHOOL OF PUBLIC HEALTH

Department of Epidemiology

Harvard T.H. Chan School of Public Health
Department of Epidemiology
677 Huntington Ave, Kresge 9th Floor
Boston, MA 02115
hsph.harvard.edu/epidemiology

Scan this QR code
to access previous
newsletters



@HarvardEpi

How to Subscribe

To subscribe, please send your email address to:
Coppelia Liebenthal — clie bent@hsph.harvard.edu

Contact the Department of Epidemiology

hsph.harvard.edu/epidemiology
Tel: 617-432-6477

Editorial Board: Eric DiGiovanni & Coppelia Liebenthal

front cover photos by Ernard Furxhi