Kelvin Fong

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STATEMENT OF PURPOSE

Our surroundings and environmental exposures have considerable impacts on our health. Through environmental health and epidemiologic research, I study their health effects and investigate strategies to minimize detriments, especially among vulnerable populations.

EDUCATION

Doctor of Science, **Harvard TH Chan School of Public Health, May 2018**
Environmental Epidemiology, Department of Environmental Health
Committee: Joel Schwartz (Chair), Francine Laden, Brent Coull, Petros Koutrakis

Master of Science, **ETH Zurich (Swiss Federal Institute of Technology), December 2012**
Environmental Sciences: Human Health, Nutrition, and Environment

Honours Bachelor of Science, **University of Toronto, June 2010**
High distinction in Physiology and Music

CURRENT POSITION

School of the Environment, Yale University
Postdoctoral Associate, July 2018 – present

Environmental Health Disparities in an Aging Population

- Assessing environmental exposures (*e.g.*, air pollution, temperature, green space) with large spatiotemporal data repositories for epidemiologic research
- Developing methods to reproducibly and efficiently perform spatial data linkage and analysis on computing clusters
- Designing and performing epidemiologic studies to estimate mortality and morbidity disparities in elderly populations across the United States
- Estimating the causal effects of potential climate and environmental policies on health disparities among socio-demographic subgroups
- Writing grants to fund research at the intersection of environmental and immigrant health

PEER-REVIEWED JOURNAL ARTICLES

21. Bell ML, **Fong KC**. Gender Differences in First/Corresponding Authorship in Public Health Research Submissions during the COVID-19 Pandemic. *American Journal of Public Health 2020: in press.*

20. **Fong KC**, Bell ML. Do Fine Particulate Air Pollution (PM2.5) Exposure and its Attributable Premature Mortality Differ for Immigrants Compared to those Born in the United States? *Environmental Research 2020: in press.*

19. **Fong KC**, Mehta NK, Bell ML. Disparities in Exposure to Surrounding Greenness Related to Proportion of the Population that were Immigrants to the United States. *International Journal of Hygiene and Environmental Health 2020, 224: 113434.*

18. **Fong KC**, Yitshak-Sade M, Lane KJ, Fabian MP, Kloog I, Schwartz JD, Coull BA, Koutrakis P, Hart JE, Laden F, Zanobetti A. Racial Disparities in Associations between Neighborhood Demographic Polarization and Birth Weight. *Int. J. Environ. Res. Public Health 2020, 17(9): 3076.*

17. Kim H, Lee JT, **Fong KC**, Bell ML. Alternative adjustment for seasonality and long-term time-trend in time-series analysis for long-term environmental exposures and disease counts. *BMC Medical Research Methodology: accepted*.

16. Nori-Sarma A, Thimmulappa RK, Venkataramana GV, Fauzie AK, Dey SK, Venkareddy LK, Berman JD, Lane KJ, **Fong KC**, Warren JL, Bell ML. Low-Cost NO2 Monitoring and Predictions of Urban Exposure Using Universal Kriging and Land-Use Regression Modelling in Mysore, India. *Atmospheric Environment 2020, 226: 117395.*

15. Qiu X, **Fong KC**, Shi L, Papatheodorou S, Di Q, Just A, Kosheleva A, Messerlian C, Schwartz JD. Prenatal Exposure to Particulate Air Pollution and Gestational Age at Delivery in Massachusetts Neonates 2001-2015 – a Perspective of Causal Modeling and Health Disparities. *Environmental Epidemiology 2020, 4(5): e113.*

14. Son JY, **Fong KC**, Heo S, Kim H, Lim CC, Bell ML. Reductions in Mortality Resulting from Reduced Air Pollution Levels due to COVID-19 Mitigation Measures. *Science of the Total Environment 2020, 744: 141012.*

13. Yitshak-Sade M, Fabian MP, Lane KJ, Hart JE, Schwartz JD, Laden F, James P, **Fong KC**, Kloog I, Zanobetti A. Estimating the Combined Effects of Natural and Built Environmental Exposures on Birthweight Among Urban Residents in Massachusetts. *Int. J. Environ. Res. Public Health 2020, 17: 8805.*

12. Yitshak-Sade M, Lane KJ, Fabian MP, Kloog I, Hart JE, Davis B, **Fong KC**, Schwartz JD, Laden F, Zanobetti A. Race or Racial Segregation? Modification of the PM2.5 and Cardiovascular Mortality Association. *PLOS One 2020, 15(7): e0236479.*

11. **Fong KC**, Kosheleva A, Kloog I, Coull BA, Koutrakis P, Laden F, Schwartz JD. Fine Particulate Air Pollution and Birthweight: Differences in Associations along the Birthweight Distribution. *Epidemiology 2019, 30(5): 617-623.*

10. **Fong KC**, Di Q, Kosheleva A, Coull BA, Koutrakis P, Laden F, Schwartz JD. Relative Toxicities of Major Particulate Matter Constituents on Birthweight in Massachusetts. *Environmental Epidemiology 2019, 3(3): e047.*

9. Gaskins AJ, Minguez-Alarcon L, **Fong KC**, Abu Awad Y, Di Q, Chavarro JE, Ford JB, Coull BA, Schwartz JD, Kloog I, Attaman J, Hauser R, Laden F. Exposure to Fine Particulate Matter and Ovarian Reserve among Women from a Fertility Clinic. *Epidemiology 2019, 30(4): 486-491.*

8. Gaskins AJ, Minguez-Alarcon L, **Fong KC**, Abu Awad Y, Di Q, Chavarro JE, Ford JB, Coull BA, Schwartz JD, Kloog I, Attaman J, Hauser R, Laden F. Supplemental Folate Intake Modifies the Relation Between Traffic-Related Air Pollution and Live Birth Among Women Undergoing Assisted Reproduction. *American Journal of Epidemiology 2019, 188(9): 1595-1604.*

7. Gaskins AJ, **Fong KC**, Abu Awad Y, Di Q, Minguez-Alarcon L, Chavarro JE, Ford JB, Coull BA, Schwartz JD, Kloog I, Souter I, Hauser R, Laden F. Time-varying Exposure to Air Pollution and Outcomes of In Vitro Fertilization Among Couples from a Fertility Clinic. *Environmental Health Perspectives 2019, 127(7).*

6. Heo, S, **Fong KC**, Bell ML. Risk of particulate matter on birth outcomes in relation to maternal socio-economic factors: a systematic review. *Environmental Research Letters 2019, 14: 123004.*

5. Kim ES, **Fong KC**, Lee L, Spiro A, Schwartz JD, Whitsel E, Horvath S, Wang CC, Hou L, Baccarelli AA, Li Y, Stewart J, Manson JE, Grodstein F, DeMeo DL, Kubzansky LD. Optimism is Not Associated with Two Indicators of DNA Methylation Aging. *Aging 2019, 11(14): 4970-4989.*

4. Yitshak-Sade M, James P, Kloog I, Hart JE, Schwartz JD, Laden F, Lane KJ, Fabian MP, **Fong KC**, Zanobetti A. Neighborhood Greenness Attenuates the Adverse Effect of PM2.5 on Cardiovascular Mortality in Neighborhoods of Lower Socioeconomic Status. *Int. J. Environ. Res. Public Health 2019, 16(5): 814.*

3. **Fong KC**, Kloog I, Coull BA, Koutrakis P, Laden F, Schwartz JD, James P. Residential Greenness and Birthweight in the State of Massachusetts, USA. *Int. J. Environ. Res. Public Health, 2018, 15(6): 1248.*

2. **Fong KC**, Hart JE, James P. A Review of Epidemiologic Studies on Greenness and Health: Updated Literature Through 2017. *Curr Environ Health Rep, 2018, 5(1): 77-87.*

1. Schwartz JD, **Fong KC**, Zanobetti A. A National Multi-City Analysis of the Causal Effect of Local Pollution, NO2, and PM2.5 on Mortality. *Environmental Health Perspectives 2018, 126(8).*

OTHER PUBLICATIONS

3. **Fong KC**, on behalf of the International Society for Environmental Epidemiology, North American Chapter. Re: Review of the Ozone National Ambient Air Quality Standards. *Washington, DC, Regulations.gov. 2020. (Public Comment)*

2. WHO Regional Office for Europe (**Fong KC** part of WHO Secretariat that coordinated and developed the publication). Review of evidence on health aspects of air pollution – REVIHAAP Project: Technical Report. *Copenhagen, World Health Organization Regional Office for Europe. 2013.*

1. **Fong KC**, Nussbaumer T. Health Effects of Aerosols from Wood Combustion. *Zurich & Bern, Swiss Federal Office for the Environment. 2012. (Peer-Reviewed Report)*

RESEARCH EXPERIENCE

Department of Environmental Health, Harvard TH Chan School of Public Health
Graduate Research Assistant, September 2013 – May 2018

Environmental Exposures during Pregnancy and Birth Weight (Dissertation Focus)

- Conceptualized, designed, and performed data linkage (> 1 mil. records) of mothers' geographic information to air pollution predictions and environmental variables
- Applied quantile regression and showed that lighter newborns were more severely affected by particulate air pollution ($PM_{2.5}$) than average-weight or heavier newborns
- Assessed nonlinearity using splines and effect modification by socioeconomic status in the relationship between residential greenness exposure and birth outcomes
- Evaluated the relative toxicity of different constituents of $PM_{2.5}$ on birth weight

Optimism and Healthy Aging (Collaboration with Social and Behavioral Sciences Department)

- Processed large sets of epigenetic data to compute methylation age
- Performed mixed effects models to understand how optimism affects the aging process

Neighborhood Social Stressors (Collaboration with Boston University)

- Investigated how neighborhood income and racial polarization affects birth weight outcomes directly and indirectly through environmental exposures

World Health Organization, European Center for Environment and Health
Intern, February 2013 – May 2013

- Compiled, edited, and formatted review of air pollution and health effects
- Authored conference paper on the health and economic impacts of environmental noise

Verenum Engineering Bureau (Zurich, Switzerland)
Pratikant, April 2011 – February 2012

- Wrote report on the health effects of wood combustion aerosols for the Swiss government

Department of Environmental Health, University of Washington (Seattle, WA)
Research Student, Summer 2009

- Investigated effect modification by single nucleotide polymorphisms on the relationship between air pollution exposure and heart left ventricular mass

Division of Critical Care Medicine, St. Michael's Hospital (Toronto, Canada)
Summer Student, Summers 2007, 2008

- Assessed how novel mechanical ventilation strategies affect diaphragm force generation

Department of Chemistry, University of Toronto
Undergraduate Research Student, September 2007 – May 2008

- Researched sources of air pollutants in Toronto using back-trajectory modeling

TEACHING EXPERIENCE

School of Forestry and Environmental Studies, Yale University
Postdoctoral Associate, July 2018 – present

- Developing and teaching short courses on modern tools for environmental exposure assessment
  - *Scaling up Spatial Analyses: Using Google Earth Engine for Satellite Imagery Retrieval, Processing, and Analysis* [link to webinar]
  - *Data Analysis Workshop on Health and Demographic Surveillance Systems in Africa (forthcoming in 2021)*
- Mentoring PhD and MSc students
  - *On research projects: e.g., Childhood Air Pollution Exposure and Expected Adult Income, Modeling Air Pollution Exposure in India for Epidemiologic Studies*
  - *On career development: e.g., searching for a postdoctoral position*
- Participating in teaching, mentoring, and diversity workshops
  - *Difficult Conversations in the Classroom (Race, Ethnicity, and Culture)*
  - *Writing Across the Disciplines*
  - *Mentoring Training Course for Postdoctoral Fellows / Associates*
  - *Unconscious Bias*

Harvard College and Harvard TH Chan School of Public Health
Teaching Fellow / Assistant, February 2016 – May 2017

- Led tutorials, labs, and graded student work in graduate and undergraduate classes
  - *Analysis of Case-Control and Cohort Studies*
  - *Analytical Methods and Exposure Assessment*
  - *Advanced Regression for Environmental Epidemiology*
  - *Energy and Climate: Vision for the Future*
  - *Environmental and Occupational Epidemiology*
- Revamped advanced regression course to use modern R packages and RMarkdown
- Developed teaching content on reproducible research and data science online course
  - *Principles, Statistical and Computational Tools for Reproducible Science*
- Completed training by the Bok Center for Teaching and Learning
  - *Active Approaches to Problem-Based Teaching*
  - *Teaching in General Education*

ETH Zurich (Swiss Federal Institute of Technology)
Teaching Assistant, February 2011 – May 2011

- Edited course materials and graded student assignments and exams
  - *Environmental Impacts, Threshold Levels and Health Effects*

SELECTED PRESENTATIONS

Invited Seminars

Fong KC. *Advancing the Understanding of How Urban Forests & Green Spaces Affect Human Health.* Faculty of Forestry, University of British Columbia, 2020.

Fong KC. *Immigrant Health: Do Environmental Exposures Play a Role?* US EPA Air, Climate and Energy (ACE) Centers Meeting, 2020.

Fong KC. *Environmental Health Disparities: Do Our Surroundings Affect Us in Different Ways?* Mel and Enid Zuckerman College of Public Health, University of Arizona, 2020.

Fong KC. *Accelerating Exposure Assessment in Environmental Epidemiology*. Earth Engine Group @ Yale Seminar Series, 2019.

Fong KC. *Surrounding Residential Greenness and Birthweight*. Chinese University of Hong Kong, 2018.

Conference Presentations

Fong KC, Bell ML. *Disparities in Premature Deaths Attributable to Fine Particulate Matter (PM2.5) Exposure between Immigrants to and those born in the United States*. International Society for Environmental Epidemiology Conference, 2020.

Fong KC, Bell ML. *Immigrant Proportion and Surrounding Greenness in the United States*. International Society for Environmental Epidemiology Conference, Utrecht, Netherlands, 2019.

Fong KC, Lane KJ, Yitshak-Sade M, Kloog I, Hart JE, Fabian MP, Zanobetti A, Schwartz JD, Laden F. *Effect Modification of the $PM_{2.5}$ Association with Birthweight by Local Residential Racial and Economic Segregation.* International Society of Exposure Science and International Society for Environmental Epidemiology Joint Conference, Ottawa, Canada, 2018.

Fong KC, James P, Kosheleva A, Schwartz JD. *Maternal Exposure to Greenness during Pregnancy and Birth Weight*. International Society for Environmental Epidemiology, Sydney, Australia, 2017.

Fong KC, Di Q, Kosheleva A, Kloog I, Schwartz JD. *Contributions to Low Birth Weight by the Constituents of Air Pollution*. International Society for Environmental Epidemiology, Rome, Italy, 2016.

AWARDS AND HONORS

Travel Award, International Society for Environmental Epidemiology, 2017, 2019.

Harvard Graduate Consortium on Energy & Environment, Harvard University Center for the Environment, 2015-2017.

Benjamin Greeley Ferris, Jr Fellowship in Environmental Epidemiology, Harvard TH Chan School of Public Health, 2015.

Glickenhaus Fund, Harvard TH Chan School of Public Health, 2014.

Doctoral Grant, Harvard TH Chan School of Public Health, 2013.

National Laureate, Excellence Awards, Canadian Merit Scholarship Foundation, 2008-2010.

Dean's List, University of Toronto, 2007-2010.

Dean's List, University of Washington, 2009.

Killam Fellowship, Fulbright Canada, 2009.

Finalist, St. Michael's Hospital Poster Competition, 2008.

Al Mercury Award, University of Toronto, 2008.

Walter and Mary Tuohy Award in Arts and Science, University of Toronto, 2008.

C.L. Burton Open Scholarship, University of Toronto, 2007

SKILLS

Computer	Statistical Modeling in R, Python, and SAS Geographic Analysis in R, Google Earth Engine, ArcGIS Linux, SLURM, Git
Languages	English & Cantonese (fluent) German (advanced) French & Mandarin (basic)

SERVICE

Grant Review	NASA Health and Air Quality Research Opportunities in Space and Earth Sciences (HAQAST ROSES)
Peer Review	*American Journal of Epidemiology;* *Atmosphere* (also board member)*;* *Environment International;* *Environmental Health;* *Environmental Health Perspectives;* *Environmental Research;* *Epidemiology;* *Journal of Exposure Science and Environmental Epidemiology;* *Journal of Racial and Ethnic Health Disparities;* *International Journal of Hygiene and Environmental Health;* *International Journal of Environmental Research and Public Health;* *Urban Forestry & Urban Greening*
Leadership	International Society for Environmental Epidemiology (ISEE) - Student and New Researcher Network (2018 – 2020), Capacity Building and Education Committee (2019 – present), North America Chapter Associate Member (2019 – present)