

# Kelvin Fong

Postdoctoral Associate, Yale University School of Forestry and Environmental Studies

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## **STATEMENT OF PURPOSE**

Our surroundings and environmental exposures have major impacts on our health. Through research, I strive to minimize health 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 Forestry and Environmental Studies, Yale University**

*Postdoctoral Associate, July 2018 – present*

Environmental Health Disparities in an Aging Population

- Assessing environmental exposures with big 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 air pollution and other environmental policies on health disparities among sociodemographic subgroups
- Writing grants to investigate the intersection of environmental and immigrant health

## **PUBLICATIONS**

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.

- Nori-Sarma A, Thimmulapps RK, Venkataramana GV, Fauzie AK, Dey SK, Venkareddy LK, Berman JD, Lane KJ, **Fong KC**, Warren JL, Bell ML. [Low-Cost NO<sub>2</sub> Monitoring and Predictions of Urban Exposure Using Universal Kriging and Land-Use Regression Modelling in Mysore, India.](#) *Atmospheric Environment* 2020, *accepted*.
- 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.
- 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.
- 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.
- 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.
- 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).
- 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.
- 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.
- 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 PM<sub>2.5</sub> on Cardiovascular Mortality in Neighborhoods of Lower Socioeconomic Status.](#) *Int. J. Environ. Res. Public Health* 2019, 16(5): 814.

**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.

**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.

Schwartz JD, **Fong KC**, Zanobetti A. [A National Multi-City Analysis of the Causal Effect of Local Pollution, NO<sub>2</sub>, and PM<sub>2.5</sub> on Mortality](#). *Environmental Health Perspectives* 2018, 126(8).

**Fong KC**, Nussbaumer T. Health Effects of Aerosols from Wood Combustion. *Zurich & Bern, Swiss Federal Office for the Environment*. 2012.

## **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<sub>2.5</sub>) 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<sub>2.5</sub> on birthweight

#### **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 short course on modern tools for environmental exposure assessment
  - *Scaling up Spatial Analyses: Using Google Earth Engine for Satellite Imagery Retrieval, Processing, and Analysis*
- Participating in teaching workshops by the Poorvu Center for Teaching and Learning
  - *Difficult Conversations in the Classroom (Race, Ethnicity, and Culture)*
  - *Writing Across the Disciplines*

**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*

**PRESENTATIONS**

**Fong KC.** *Advancing Exposure Assessment in Public Health.* Yale University GIS Day, New Haven, Connecticut, 2019.

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

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

Yitshak-Sade M, Fabian MP, Lane KJ, Hart JE, Schwartz JD, Laden F, James P, **Fong KC**, Kloog I, Zanobetti A. *The combined impact of environmental and built environment exposures on birthweight in an urban population in Massachusetts.* International Society of Environmental Epidemiology Conference, Utrecht, Netherlands, 2019.

Gaskins AJ, Minguez-Alarcon L, Williams P, **Fong KC**, Abu Awad Y, Di Q, Chavarro J, Schwartz JD, Hauser R, Laden F. *NO<sub>2</sub> Air Pollution Exposure Assessment in Urban Mysore, India.* International Society of Environmental Epidemiology Conference, Utrecht, Netherlands, 2019.

Nori-Sarma A, Thimulappa R, Venkataramana G, Fauzie A, Dey S, Venkareddy L, Berman J, Lane KJ, **Fong KC**, Bell ML. *NO<sub>2</sub> Air Pollution Exposure Assessment in Urban Mysore, India.* International Societies of Exposure Science (ISES) and Indoor Air Quality and Climate (ISIAQ) Conference, Kaunas, Lithuania, 2019.

**Fong KC.** *Disparities in Surrounding Greenness by Immigrant Proportion.* Yale F&ES Research Day, Yale University, New Haven, CT, USA, 2019.

**Fong KC.** *Google Earth Engine and Environmental Epidemiology.* GIS-Day, Yale University, New Haven, CT, USA, 2018.

**Fong KC.** *Surrounding Residential Greenness and Birthweight.* Chinese University of Hong Kong, Hong Kong, China, 2018. (Invited Seminar)

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

Yitshak-Sade M, Lane KJ, Kloog I, Hart JE, **Fong KC**, Schwartz JD, Laden F, Fabian MP, Zanobetti A. *PM<sub>2.5</sub> and Mortality: Modification of the Association by Personal and Area Level Indicators of Socioeconomic Status.* International Society of Exposure Science and International Society of Environmental Epidemiology Joint Conference, Ottawa, Canada, 2018.

Gaskins AJ, **Fong KC**, Abu Awad Y, Minguez-Alarcon L, Chavarro JE, Coull BA, Schwartz JD, Hauser R, Laden F. *Time-Varying Exposure to Fine Particulate Matter and Black Carbon and Outcomes of In Vitro Fertilization*. International Society of Exposure Science and International Society of Environmental Epidemiology Joint Conference, Ottawa, Canada, 2018.

**Fong KC**, Lane KJ, Kloog I, Schwartz JD, Hart JE, Zanobetti A. *The Effects of Neighborhood Social Stressors on Birth Weight*. International Society of Environmental Epidemiology, Sydney, Australia, 2017.

**Fong KC**, James P, Kosheleva A, Schwartz JD. *Maternal Exposure to Greenness during Pregnancy and Birth Weight*. International Society of 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 of Environmental Epidemiology, Rome, Italy, 2016.

**Fong KC**, Kosheleva A, Kloog I, Schwartz JD. *Quantile Regression of Maternal Exposure to Particulate Air Pollution and Birth Weight*. International Society of Environmental Epidemiology, Rome, Italy, 2016.

George F, Heroux ME, **Fong KC**. *Public Health and Economic Burden of Environmental Noise*. Internoise: Noise Control for Quality of Life, Innsbruck, Austria, 2013.

**Fong KC**, Nussbaumer T. *Health Effects of Wood Combustion Aerosols*. 16th ETH Conference on Combustion Generated Nanoparticles, Zurich, Switzerland, 2012.

**Fong KC**, Haitsma JJ, Zhang H, Slutsky AS. *Lung Protective Ventilation Improves Diaphragm Force Generating Capacity*. Institute of Medical Sciences, University of Toronto, 2008.

**Fong KC**, Murphy JG. *Atmospheric Pollutants in Downtown Toronto*. Undergraduate Research Fair, University of Toronto, 2008.

## **AWARDS AND HONORS**

**Travel Award**, International Society of 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.

**Glickenhau 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
Languages	English & Cantonese (fluent) German (advanced) French & Mandarin (basic)

## **SERVICE**

Reviewer	<i>Atmosphere;</i> <i>Epidemiology;</i> <i>Journal of Exposure Science and Environmental Epidemiology;</i> <i>International Journal of Hygiene and Environmental Health;</i> <i>International Journal of Environmental Research and Public Health;</i> <i>Urban Forestry &amp; Urban Greening</i>
Steering Committee	International Society of Environmental Epidemiology (ISEE) - Student and New Researcher Network, Capacity Building and Education Committee