PI profile

## [Augustine] [Kong]

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| Professor Augustine Kong | **Dr. Augustine Kong**  **Titles**: Group Leader / PI / Professor of Statistical Genetics  **Group:** Kong  **Location**: Big Data Institute  **Department**: Nuffield Department of Medicine  **Email**: augustine.kong@bdi.ox.ac.uk |

### GMS themes:

* Genome biology (genomes and genetic variation)
* Genomics of disease
* Genomic analysis (bioinformatics and statistical genetics)

### Research Overview

My current research interest is on direct and indirect genetic effects, the latter includes genetic nurturing (see ref 1 and the New York Times link given below). I am also studying participation in a genetic study as an independent genetic trait. My general research interests include (i) recombination, (ii) genotype associations of diseases/traits such as type 2 diabetes, heart diseases, Alzheimer disease, schizophrenia, educational attainment, and fertility (iii) parent of origin effects, (iv) de novo mutations, and (v) somatic mutations. Further information can be found in my google scholar page.

Project areas:

Methods to decompose various factors that contribute to genotype-phenotype associations

Please contact directly for further information.

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Project proposal

# **Title**: **Methods to decompose various factors that contribute to genotype-phenotype associations**

Supervisors: Augustine Kong

Wet/dry lab mix: 100% dry lab

Description: Genotype-phenotype associations result from direct and indirect genetic effects and confounding due to population stratification and assortative mating (refs 1, 2, 3). Data of nuclear families and/or first-degree relative pairs can be used to separate out these effects. Methods to do so exist. Our aim is to further develop these methods: (a) to increase statistical power (refs 4, 5), and (b) to incorporate more complex models. For example, with (b), most analyses currently do not take into account ascertainment bias, i.e. the individuals in a study such as the UK Biobank is not a random sample drawn from the population.

### Background reading / references:

1. **Kong A**, Thorleifsson G, Frigge ML, Vilhjalmasson BJ, Young AI, Thorgeirsson TE, Benonisdottir S, Oddsson A, Halldorsson BV, Masson G, Gudbjartsson DF, Helgason A, Bjornsdottir G, Thorsteinsdottir U, Stefansson K. The nature of nurture: Effects of parental genotypes. ***Science*.** 2018, Jan 26, 359(6374):424-428.
2. Young AI, Benonisdottir S, Przeworski M, **Kong A**. Deconstructing the sources of genotype-phenotype associations in humans. ***Science*.** 2019, Sep 27, 365(6460):1396-1400.
3. Young AI, Frigge ML, Gudbjartsson DF, Thorleifsson G, Bjornsdottir G, Sulem P, Masson G, Thorsteinsdottir U, Stefansson K, **Kong A**. Relatedness Disequilibrium Regression estimates heritability without environmental bias. ***Nat Genet.*** 2018 Sep, 50(9):1304-1310.
4. **Kong A**, Benonisdottir S, Young AI. Family analysis with Mendelian Imputations. ***bioRxiv.*** 2020.
5. Young AI, Nehzati SM, Lee C, Benonisdottir S, Cesarini D, Benjamin D, Turley P, **Kong A**. Mendelian Imputations of parental genotypes for genome-wide estimation of direct and indirect genetic effects. ***bioRxiv*.** 2020.

https://www.nytimes.com/2018/01/25/science/children-parents-genes-education.html

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