

### The Hong Kong University of Science and Technology

### **Department of Mathematics**

## **PhD THESIS EXAMINATION**

# Statistical Methods for Dealing with Measurement Error in Covariates: EPIC-InterAct Study

By

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#### <u>ABSTRACT</u>

In this thesis, we explore statistical methods for covariates measured with error in the EPIC-InterAct Study. Covariate measurement error is an inevitable problem in nutritional epidemiology, for example, dietary intake assessed with a food frequency questionnaire is prone to measurement error. Ignoring measurement error in covariates will cause bias in parameter estimation as well as loss of power. Based on the characteristics of the data of the EPIC-InterAct Study, that is, 24HR intake measurements are biased and errors in FFQ and 24HR measurements are highly correlated, we propose an additive error model. To correct covariate measurement error in the proposed error model, we propose an approximate maximum likelihood estimation (AMLE) under the logistic regression model and an approximate profile likelihood estimation conditions. For comparison, simulation studies are conducted to examine the finite-sample performances of our proposed methods as well as other existing correction approaches. We apply our proposed methods, i.e., AMLE and APLE, along with some other methods to deal with measurement errors in interested nutrients of the EPIC-InterAct Study under sensitivity analysis framework.

Date:	16 May 2019, Thursday
Time:	2:00 p.m.
Venue:	<b>Room 4475 (near lifts 25-26)</b>

#### **Thesis Examination Committee:**

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(Open to all faculty and students)

The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).