YANG LIU

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EDUCATION

University of Hong Kong (Hong Kong, CHN) Sep 2016-Jul 2018 (expected)
M.Phil. in Biostatistics (Research-Based)
- School of Public Health, Li Ka Shing Faculty of Medicine
- State Key Laboratory of Emerging Infectious Diseases
- Advisor: Dr. Tommy Tsan-Yuk Lam, Dr. Joseph Tsz-Kei Wu

University of Cambridge (Cambridge, UK) Oct 2015-Jul 2016
M.A.St. in Mathematical Statistics (Part III of Mathematical Tripos)
- Department of Pure Mathematics and Mathematical Statistics
- Wolfson College
- Graduate with Distinction (Highest Class)

Nankai University (Tianjin, CHN) Sep 2011-Jul 2015
B.Sc. in Statistics
- Department of Statistics, School of Mathematical Sciences
- Overall GPA: 3.84/4.0

National University of Singapore (Singapore, SG) Jan 2015-May 2015
Exchange Program Sponsored by Chinese Government
- Department of Statistics and Applied Probability
- GPA: 5.0/5.0

Summer School, University of Cambridge & University of Oxford Jul 2014-Aug 2014

RESEARCH EXPERIENCE

Geographically Weighted Temporally Correlated Logistic Regression Model
Supervised by Dr. Tommy Lam, collaborated with Dr. Eddy Lam and Dr. Joseph Wu.
Oct. 2016 — Jun. 2017
- *Background and role:* Detecting the temporally and spatially varying correlations is important to understand the biological and disease systems. I proposed a geographically weighted temporally correlated logistic regression (GWTCLR) model as a natural extension of GWLR model (Fotheringham et al. 2002) and two-step estimation (Dong et al. 2016) to identify such dynamic correlation of predictors on binomial outcome data, by incorporating spatial and temporal information for joint inference. The local likelihood method (Cai et al. 2000) is adopted to estimate the spatial relationship, while the smoothing method (Fan et al. 1996) is employed to estimate the temporal variation. To accommodate the potential correlation among the longitudinal data with autocorrelation structure as a special case, the concept of tetrachoric correlation (Lecessie et al. 1994) is adopted in the model. I constructed and implemented GWTCLR in Mathematica, and studied the asymptotic properties of the proposed estimator. Simulation studies were conducted to evaluate the robustness of the proposed model. GWTCLR was applied on real epidemiologic data to study the climatic determinants of human seasonal influenza epidemics. Our method obtained consistent results with previous studies but also revealed certain spatial and temporal varying patterns that were unobservable by previous models and methods.
- Manuscript is submitted.

Climatic Factors Driving the Transmission of Human Influenza and Other Respiratory Viruses
Supervised by Dr. Tommy Lam, collaborated with INSPIRE network.
Feb. 2017—Present
- *Background and role:* Communicable human respiratory diseases are caused by a range of fast evolving RNA viruses including influenza A (FluA) and B (FluB) virus, respiratory syncytial virus (RSV) and parainfluenza virus (PIV), etc. Previous studies (Lowen et al. 2007, Tamerius et al. 2013 and Deyle et al. 2016) have shown that some climatic factors may play roles in driving the disease transmission and prevalence. In this study, epidemiologic data of FluA, FluB, RSV and PIV in various geographical locations (e.g. North America, Europe, Middle East, Africa, Asia and Oceania) were collected through a global research network INSPIRE. I employed wavelet transform to analyse the periodicity of these four pathogens in different regions. I used the convergent cross-mapping (Sugihara et al. 2012) and forecast improvement techniques to investigate the climatic drivers for the global prevalence of these

respiratory pathogens. I also further examined the effect of these climatic drivers under different conditions by adopting an empirical dynamic modeling framework. I wrote programming code in R to conduct these analyses. In addition, I proposed a turning-point hypothesis to account for the different transmission pattern of FluA in the temperate region (annual peak) and sub-tropical region (semi-annual peak). Simulation studies were conducted to validate the hypothesis.

- Manuscript is in preparation.

SUBMITTED PUBLICATIONS

Yang Liu, Kwok-Fai Lam, Joseph Tsz-Kei Wu, Tommy Tsan-Yuk Lam* (2017), **Geographically Weighted Temporally Correlated Logistic Regression Model.** Submitted.

AWARDS

2016	**Postgraduate Scholarship (HK$384,360)** Awarded for two years study at the University of Hong Kong.	
2016	**Jennings Prize (£300)** Awarded by Wolfson College Cambridge due to attaining Distinction at the Math Tripos Part III examination.	
2015	**Chinese Government Scholarship (S$9,000)** Awarded by China Scholarship Council to support five months exchange study at the National University of Singapore.	
2014	**Meritorious Winner for Mathematical Contest in Modelling** Awarded in the international contest for the paper which analysed the optimization of the traffic flow in different driving rules.	
2014	**The Second Class Prize in Tianjin Competition Area, China Undergraduate Mathematical Contest in Modelling**	
2014	**The Third Class Prize for "100 Projects" of creative research at Nankai University** Awarded for the research report "College Student's Motivation for Credit Card Application-Universities in Tianjin as an Example".	
2013	**The Second Class Prize for Excellent Paper in Shenzhen Cup National Summer Camp of Mathematical Modelling** Awarded for the paper which analysed the difference of traffic congestion between districts of the special economic zone of Shenzhen and those outside the zone. Only eight teams qualified for this prize in China.	
2013	**The First Class Prize in Tianjin Competition Area, China Undergraduate Mathematical Contest in Modelling** Awarded for the paper which analysed the relationship between traffic congestion and occupied traffic lane.	
2013	**The First Class Prize in Mathematical Contest in Modelling of Nankai University**	
2011-2015	**Several times of undergraduate scholarships at Nankai University (¥1,500 each)**	

CONFERENCE ATTENDANCE

Next Generation Informatics for Global Health: Disease Dynamics and Digital Epidemiology, 17-19 July 2017, the University of Hong Kong, Hong Kong, China.

REQUIRED EXAMINATIONS

- **GRE:** Verbal Reasoning 157, Quantitative Reasoning 170, Analytical Writing 4.0.
- **TOEFL:** Reading 30, Listening 27, Speaking 23, Writing 27. Total Score 107.

SOFTWARE SKILLS

R, Wolfram Mathematica, C, Adobe Illustrator, EndNote, Microsoft Office and LaTeX.