# Yijun **Lou**

Doctor of Philosophy · Associate Professor

*Department of Applied Mathematics, The Hong Kong Polytechnic University, Hong Kong, P. R. China*

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## Education

**Ph.D. in Applied Mathematics** — *June 2010*

Memorial University of Newfoundland — *Canada*

- Supervisor: Prof. Xiaoqiang Zhao (University Research Professor)
- Thesis Title: Global Dynamics of Some Malaria Models in Heterogeneous Environments

**M.S. in Applied Mathematics** — *January 2007*

Zhejiang Normal University — *China*

- Supervisor: Prof. Fangyue Chen
- Thesis Title: Bifurcation of Travelling Wave Solutions in A Nonlinear Variant of The RLW Equation

**B.S. in Mathematics** — *June 2003*

Zhejiang Normal University — *China*

## Experience

**Associate Professor** — *July 2018-current*

Department of Applied Mathematics, Hong Kong Polytechnic University — *Hong Kong, China*

**Assistant Professor** — *August 2012-June 2018*

Department of Applied Mathematics, Hong Kong Polytechnic University — *Hong Kong, China*

**Mprime NCE Postdoctoral Fellowship** — *Jan 2011-Aug 2012*

Department of Mathematics and Statistics, York University — *Canada*

Supervisors: Prof. Jane Heffernan and Prof. Jianhong Wu

**Postdoctoral Fellowship** — *July-December, 2010*

Department of Mathematics and Statistics, York University — *Canada*

Supervisors: Prof. Jane Heffernan and Prof. Jianhong Wu

## Research interests

- Applied Dynamical Systems, Differential Equations
- Mathematical Epidemiology and Mathematical Biology
- Transmission Dynamics in Complex Networks

## Academic services

- Associated Editor: Infectious Disease Modelling
- Associate Editor: Mathematical Biosciences and Engineering
- Editorial Board Member: BMC Research Notes
- Reviewer: Mathematical Reviews of AMS

## Journal papers

55. Daihai He, Zhao Shi, Yingke Li, Peihua Cao, Daozhou Gao, **Yijun Lou**, Lin Yang, Comparing COVID-19 and the 1918-19 influenza pandemics in United Kingdom, *International Journal of Infectious Diseases*, Available online 26 June 2020.
54. Shi Zhao, Peihua Cao, Marc KC Chong, Daozhou Gao, **Yijun Lou**, Jinjun Ran, Kai Wang, Weiming Wang, Lin Yang, Daihai He, Maggie H Wang, COVID-19 and gender-specific difference: Analysis of public surveillance data in Hong Kong and Shenzhen, China, from January 10 to February 15, 2020, *Infection Control & Hospital Epidemiology*, 41(2020), 750-751.
53. Shi Zhao, Daozhou Gao, Zian Zhuang, Marc KC Chong, Yongli Cai, Jinjun Ran, Peihua Cao, Kai Wang, **Yijun Lou**, Weiming Wang, Lin Yang, Daihai He, Maggie H Wang, Estimating the serial interval of the novel coronavirus disease (COVID-19): A statistical analysis using the public data in Hong Kong from January 16 to February 15, 2020, submitted.
52. Jinjun Ran, Shi Zhao, Zian Zhuang, Marc KC Chong, Yongli Cai, Peihua Cao, Kai Wang, **Yijun Lou**, Weiming Wang, Daozhou Gao, Lin Yang, Daihai He, Maggie H Wang, Quantifying the improvement in confirmation efficiency of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) during the early phase of outbreak in Hong Kong in 2020, *International Journal of Infectious Diseases*, 96(2020), 284-287.
51. Zian Zhuang, Shi Zhao, Qianying Lin, Peihua Cao, **Yijun Lou**, Lin Yang, Daihai He, Preliminary estimation of the novel coronavirus disease (COVID-19) cases in Iran: A modelling analysis based on overseas cases and air travel data, *International Journal of Infectious Diseases*, 94(2020), 29-31.
50. Zian Zhuang, Shi Zhao, Qianying Lin, Peihua Cao, **Yijun Lou**, Lin Yang, Shu Yang, Daihai He, Li Xiao, Preliminary estimating the reproduction number of the coronavirus disease (COVID-19) outbreak in Republic of Korea and Italy by 5 March 2020, *International Journal of Infectious Diseases*, 95(2020), 308-310.

49. Shi Zhao, Peihua Cao, Daozhou Gao, Zian Zhuang, Yongli Cai, Jinjun Ran, Marc KC Chong, Kai Wang, **Yijun Lou**, Weiming Wang, Lin Yang, Daihai He, Maggie H Wang, Serial interval in determining the estimation of reproduction number of the novel coronavirus disease (COVID-19) during the early outbreak, *Journal of Travel Medicine*, 27(2020), taaa033, https://doi.org/10.1093/jtm/taaa033.

48. Qianying Lin, Shi Zhao, Daozhou Gao, **Yijun Lou**, Shu Yang, Salihu S Musa, Maggie H Wang, Yongli Cai, Weiming Wang, Lin Yang, Daihai He, A conceptual model for the outbreak of Coronavirus disease 2019 (COVID-19) in Wuhan, China with individual reaction and governmental action, *International Journal of Infectious Diseases*, 93(2020), 211-216.

47. Shi Zhao, Zian Zhuang, Peihua Cao, Jinjun Ran, Daozhou Gao, **Yijun Lou**, Lin Yang, Yongli Cai, Weiming Wang, Daihai He, Maggie H Wang, Quantifying the association between domestic travel and the exportation of novel coronavirus (2019-nCoV) cases from Wuhan, China in 2020: a correlational analysis, *Journal of Travel Medicine*, 27(2020), taaa022, https://doi.org/10.1093/jtm/taaa022.

46. Shi Zhao, Qianyin Lin, Jinjun Ran, Salihu S Musa, Guangpu Yang, Weiming Wang, **Yijun Lou**, Daozhou Gao, Lin Yang, Daihai He, Maggie H Wang, Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak, *International Journal of Infectious Diseases*, 92(2020), 214-217.

45. Shi Zhao, Salihu S Musa, Qianying Lin, Jinjun Ran, Guangpu Yang, Weiming Wang, **Yijun Lou**, Lin Yang, Daozhou Gao, Daihai He, Maggie H Wang, Estimating the unreported number of novel coronavirus (2019-nCoV) cases in China in the first half of January 2020: a data-driven modelling analysis of the early outbreak, *Journal of Clinical Medicine*, 9(2020), 388.

44. Zhimin Chen, Kaihui Liu, Xiuxiang Liu, **Yijun Lou**, Modelling epidemics with fractional-dose vaccination in response to limited vaccine supply, *Journal of Theoretical Biology*, 486 (2020), 110085.

43. Liang Zhang, Kaihui Liu, **Yijun Lou** and Zhi-Cheng Wang, Spatial dynamics of a nonlocal model with periodic delay and competition , *European Journal of Applied Mathematics*, DOI: https://doi.org/10.1017/S0956792519000408.

42. Zhenguo Bai, **Yijun Lou**, and Xiao-Qiang Zhao, A delayed succession model with diffusion for the impact of diapause on population growth, *SIAM Journal on Applied Mathematics*, 80(2020), 1493-1519.

41. Jingyi Wang, Jianwen Feng, **Yijun Lou** and Guanrong Chen, Synchronization of networked harmonic oscillators via quantized sampled velocity feedback, *IEEE Transactions on Automatic Control*, 2020, in press.

40. **Yijun Lou**, Kaihui Liu, Daihai He, Daozhou Gao and Shigui Ruan, Modelling diapause in mosquito population growth, *Journal of Mathematical Biology*, 78(2019), 2259-2288.

39. Shiyong Zhu, Yang Liu, **Yijun Lou** and Jinde Cao, Stabilization of logical control networks: an event-triggered control approach, *Science China Information Sciences (SCIS)*, 63(2020), 112203.

38. Wang Yaqi, Lu Jianquan and **Yijun Lou**, Halanay-type inequality with delayed impulses and its applications, *Science China Information Sciences (SCIS)*, 62(2019), 192206.

37. Yaqi Wang, Jianquan Lu and **Yijun Lou**, Stability of switched systems with limiting average dwell time, *International Journal of Robust and Nonlinear Control*, 29(2019), 5520-5532.

36. Shi Zhao, **Yijun Lou**, Alice P.Y. Chiu and Daihai He, Modelling the Skip-and-resurgence of Japanese Encephalitis Epidemics in Hong Kong, *Journal of Theoretical Biology*, 454(2018), 1-10.

35. Mengfeng Sun, **Yijun Lou**, Jinqiao Duan and Xinchu Fu, Behavioral synchronization induced by epidemic spread in complex networks, *Chaos*, 27(2017), 063101.

34. **Yijun Lou** and Jianhong Wu, Modeling Lyme disease transmission, *Infectious Disease Modelling*, (2)2017, 229-243.

33. Yan Wang, Kaihui Liu and **Yijun Lou**, An age-structured within-host HIV model with T-cell competition, *Nonlinear Analysis: Real World Applications*, 38(2017), 1-20.

32. Kaihui Liu, **Yijun Lou** and Jianhong Wu, Analysis of an age structured model for tick populations subject to seasonal effects, *Journal of Differential Equations*, 263(2017), 2078-2112.

31. **Yijun Lou**, Li Liu and Daozhou Gao, Modeling co-infection of ***Ixodes*** tick-borne pathogens, *Mathematical Biosciences and Engineering*, 14(2017), 1301-1316.

30. Stephen A. Gourley, Rongsong Liu and **Yijun Lou**, Intra-specific competition and insect larval development: a model with time-dependent delay, *Proceedings of the Royal Society of Edinburgh, Section A*, 147A(2017), 353-369.

29. Daihai He, Daozhou Gao, **Yijun Lou**, Shi Zhao and Shigui Ruan, A comparison study of Zika virus outbreaks in French Polynesia, Colombia and the State of Bahia in Brazil, *Scientific Reports*, 7(2017), 273.

28. **Yijun Lou** and Xiao-Qiang Zhao, A theoretical approach to understanding population dynamics with seasonal developmental durations, *Journal of Nonlinear Science*, 27(2017), 573-603.

27. Daozhou Gao, **Yijun Lou**, Daihai He, Travis C. Porco, Yang Kuang, Gerardo Chowell and Shigui Ruan, Prevention and control of Zika as a mosquito-borne and sexually transmitted disease: A mathematical modeling analysis, *Scientific Reports*, 6(2016), 28070. Volume: 6 Article Number: 28070

26. Jian Fang, **Yijun Lou** and Jianhong Wu, Can pathogen spread keep pace with its host invasion?, *SIAM Journal on Applied Mathematics*, 76(2016), 1633-1657.

25. Jianquan Li and **Yijun Lou**, Characteristics of an epidemic outbreak with a large initial infection size, *Journal of Biological Dynamics*, 10(2016), 366-378.

24. Xia Wang, **Yijun Lou** and Xinyu Song, Age-structured within-host HIV dynamics with multiple target cells, *Studies in Applied Mathematics* , 138(2017), 43-76.

23. Qingchu Wu, **Yijun Lou** and Wenfang Zhu, Epidemic outbreak for an SIS model in multiplex networks with immunization, *Mathematical Biosciences*, 277(2016), 38-46.

22. Qingchu Wu and **Yijun Lou**, Local immunization program for SIR epidemic model in social networks, *Chaos*, 26(2016), 023108.

21. Kit Ian Kou, **Yijun Lou** and Yong-Hui Xia, Zeros of a class of transcendental equation with application to bifurcation of DDE, *International Journal of Bifurcation and Chaos*, 26(2016), 1650062.

20. Jian Fang, Stephen Gourley and **Yijun Lou**, Stage-structured models of intra- and inter-specific competition within age classes, *Journal of Differential Equations*, 260(2016), 1918-1953.
19. Guihong Fan, **Yijun Lou**, Horst R. Thieme and Jianhong Wu, Stability and persistence in ODE models for populations with many stages, *Mathematical Biosciences and Engineering*, 12(2015), 661-686.
18. **Yijun Lou**, Jianhong Wu and Xiaotian Wu, Impact of biodiversity and seasonality on Lyme-pathogen transmission, *Theoretical Biology and Medical Modelling*, 11(2014), 50.
17. Jane M. Heffernan, **Yijun Lou** and Jianhong Wu, Range expansion of ***Ixodes scapularis*** ticks and of ***Borrelia burgdorferi*** by migratory birds, *Discrete and Continuous Dynamical Systems-Series B*, 19(2014), 3147-3167.
16. Daozhou Gao, **Yijun Lou** and Shigui Ruan, A periodic Ross-Macdonald model in a patchy environment, *Discrete and Continuous Dynamical Systems-Series B*, 19(2014), 3133-3145.
15. Stephen A. Gourley and **Yijun Lou**, A mathematical model for the spatial spread and biocontrol of the Asian longhorned beetle, *SIAM Journal on Applied Mathematics*, 74(2014), 864-884.
14. Jane M. Heffernan, **Yijun Lou**, Marc Steben and Jianhong Wu, Cost-effectiveness evaluation of gender-based vaccination programs against sexually transmitted infections, *Discrete and Continuous Dynamical Systems-Series B*, 19(2014), 447-466.
13. **Yijun Lou** and Jianhong Wu, Tick seeking assumptions and their implications for Lyme disease predictions, *Ecological Complexity*, 17(2014), 99-106.
12. Xiaotian Wu, Venkata R. Duvvuri, **Yijun Lou**, Nicholas H. Ogden, Yann Pelcat and Jianhong Wu, Developing a temperature-driven map of the basic reproductive number of the emerging tick vector of Lyme disease ***Ixodes scapularis*** in Canada, *Journal of Theoretical Biology*, 319(2013), 50-61.
11. **Yijun Lou**, Redouane Qesmi, Qin Wang, Marc Steben, Jianhong Wu and Jane M. Heffernan, Epidemiological impact of a genital herpes type 2 vaccine for young females, *PLOS ONE*, 7(2012), e46027.
10. Jie Lou, **Yijun Lou** and Jianhong Wu, Threshold virus dynamics with impulsive antiretroviral drug effects, *Journal of Mathematical Biology*, 65(2012), 623-652.
9. **Yijun Lou** and Xiao-Qiang Zhao, Modelling malaria control by introduction of larvivorous fish, *Bulletin of Mathematical Biology*, 73(2011), 2384-2407.
8. **Yijun Lou** and Xiao-Qiang Zhao, A reaction-diffusion malaria model with incubation period in the vector population, *Journal of Mathematical Biology*, 62(2011), 543-568.
7. Xiuxiang Liu and **Yijun Lou**, Global dynamics of a predator-prey model, *Journal of Mathematical Analysis and Applications*, 371(2010), 323-340.
6. **Yijun Lou** and Xiao-Qiang Zhao, The periodic Ross-Macdonald model with diffusion and advection, *Applicable Analysis*, 89(2010), 1067-1089.
5. **Yijun Lou** and Xiao-Qiang Zhao, A climate-based malaria transmission model with structured vector population, *SIAM Journal on Applied Mathematics*, 70(2010), 2023-2044.
4. **Yijun Lou** and Xiao-Qiang Zhao, Threshold dynamics in a time-delayed periodic SIS epidemic model, *Discrete and Continuous Dynamical Systems-Series B*, 12(2009), 169-186.
3. **Yijun Lou**, Fangyue Chen and Junbiao Guan, Fingerprint feature extraction via CNN with von Neumann neighborhood, *International Journal of Bifurcation and Chaos*, 17 (2007), 4145-4151.
2. **Yijun Lou**, Bifurcation of travelling wave solutions in generalized phi-four equation, *Applied Mathematics and Computation*, 190(2007), 517-525.
1. **Yijun Lou**, Bifurcation of travelling wave solutions in a nonlinear variant of the RLW equation, *Communications in Nonlinear Science and Numerical Simulation*, 12(2007), 1488-1503.

## Research grants

- Project Title: The effects of an HSV-2 vaccine against HSV-2 and HSV-1, **MITACS NCE Postdoc Research Project** (competitive and peer-reviewed), CAD$110,000 years, December 2010-December 2012.
- Project Title: Lyme disease transmission dynamics, **National Natural Science Foundation of China (NSFC)** (competitive and peer-reviewed), January 2014-December 2016. RMB230,000.
- Project Title: Theory of asymptotically periodic systems and its applications to impulsive biological systems, **Early Career Scheme (ECS)** (competitive and peer-reviewed), July 2014-31 March 2018. HKD$553,870.
- Project Title: Global dynamics in age-structured delay models with seasonality, **General Research Fund (GRF)** (competitive and peer-reviewed), July 2016-December 2018. HKD$217,874.
- Co-I project: 2019 Novel Coronavirus Pneumonia Epidemic Predictive Model, **Alibaba (China) Co., Ltd. Collaborative funding**, 13 Apr 2020-12 Apr 2021. HKD$450,000
- Project Title: Integrated assessment modeling on pharmaceutical interventions for reducing disease transmission, **National Natural Science Foundation of China (NSFC)** (competitive and peer-reviewed), January 2020-December 2023. RMB510,000.
- Several other internal grants from PolyU and AMA.

## Conference invited talks

- International Conference on Dynamical Modeling, Analysis, and Applications in Mathematical Biosciences (virtual), June 17-19, 2021
- The 2021 virtual Annual Meeting and Conference of the Society for Mathematical Biology (SMB), June 13-17, 2021
- 2019 Mathematical Biology Forum, Yuncheng University, Shanxi Province, China, July 5-8, 2019

- The 2019 Annual Meeting and Conference of the Society for Mathematical Biology (SMB), Montreal, Canada, July 21-26, 2019.
- International Conference on Dynamical Systems and Applications, Lanzhou, China, June 20-23, 2019
- CCEC-LIAM workshop ion complec network system, Jinan, May 4-6, 2019
- CSIAM annual meeting, Chengdu, September 13-16, 2018
- The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taipei, July 5-July 9, 2018
- 6th International Conference on Mathematical Biology, Beijing, June 22-25, 2018
- 12th International Conference on Recent Advances in Applied Dynamical Systems, Chongqing, China, June 8-10, 2018
- 2018 NCTS Workshop on Mathematical Biology, National Tsing Hua University, May 28-June 1, 2018
- 2018 Joint Mathematics Meetings (JMM), San Diego, USA, January 10-13, 2018.
- JRI workshop on Applied Mathematics, Beijing, Jan 5-6, 2018
- The Fourth International Workshop on Biomathematics Modelling and Its Dynamical Analysis, Kobe University, Oct 3-6, 2017
- Poster display for the RGC visit on 15 June 2017.
- The second Mathematical Congress of the Americas (MCA), Montreal, Canada, July 24-28, 2017.
- The Eleventh International Conference on Recent Advances in Applied Dynamical Systems, Xi'an, June 8-11, 2017.
- 2017 China-Canada International Conference on Disease Modelling (CCICDM), Shanghai University, June 2-5, 2017.
- The Eighth Conference of Chinese Biomathematical Society, Yangzhou, China, July 17-21, 2016.
- The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, USA, July 1-5, 2016.
- Tenth International Conference on Recent Advances in Applied Dynamical Systems, Xuzhou, Jiangsu, China, June 10-12, 2016.
- International Conference on Applications of Mathematics to Nonlinear Sciences (AMNS-2016), Kathmandu, Nepal, May 26-29, 2016. *(Plenary/Special Invited Speaker)*
- The 5th International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA-V), University of Western Ontario, London, Ontario, Canada, October 2-4, 2015.
- 2015 Joint Meeting of JSMB and CJK Colloquium on Mathematical Biology, Doshisha University, Kyoto, Japan, August 26-29, 2015.
- The Ninth International Conference on Recent Advances in Pure and Applied Dynamical Systems, Guangzhou University, June 2-4, 2015.
- Eleventh National Forum on Network Science, Shanghai University, April 17-20, 2015.
- 2014 CDM Incubation Day, York University, August 8, 2014.
- The Eighth International Conference on Recent Advances in Applied Dynamical Systems, Guilin, China, June 4, 2014.
- NCTS International Conference on Nonlinear Dynamics with Applications to Biology, National Tsing-Hua University, May 29, 2014.
- Department Seminar, Department of Mathematics at China Jiliang University, November 22, 2013.
- 2013 AARMS Mathematical Biology Workshop, Memorial University of Newfoundland, Canada, July 27, 2013.
- The Fourth Conference on Computational and Mathematical Population Dynamics, North University of China, May 31, 2013.
- 2012 Workshop on Network Transmission Dynamics, Shanghai University, December 1, 2012.

## Review for journals

Applied Mathematics Letters; BMC Infectious Diseases; BMC Public Health; BMC Research Notes; Bulletin of Mathematical Biology; Canadian Mathematical Bulletin; Chaos, Solitons & Fractals; Computational and Mathematical Methods in Medicine; Computational Biology Journal; Discrete Dynamics in Nature and Society; Differential Equations and Dynamical Systems; Discrete and Continuous Dynamical Systems-Series B; Ecological Complexity; Electronic Journal of Differential Equations; European Journal of Applied Mathematics; Frontiers in Public Health; IEEE Transactions on Neural Networks and Learning Systems; IMA Journal of Applied Mathematics; Infectious Disease Modelling; International Journal of Bifurcation and Chaos; International Journal of Infectious Diseases; International Journal of Robust and Nonlinear Control; Journal of Applied Mathematics; Journal of the Franklin Institute; Journal of Nonlinear Science; Journal of Biological Systems; Journal of Dynamics and Differential Equation; Journal of Mathematical Analysis and Applications; Journal of Mathematical Biology; Journal of Medical Virology; Journal of Theoretical Biology; Journal of Veterinary Science & Medicine; Mathematical Biosciences; Mathematical Biosciences and Engineering; Mathematical Methods in the Applied Sciences; Mathematical Population Studies; Nonlinear Analysis-Series A: Theory, Methods & Applications; PeerJ; Scientific Reports; Pattern Recognition; Preventive Medicine; SIAM/ASA Journal on Uncertainty Quantification; SIAM Journal on Applied Dynamical Systems; SIAM Journal on Applied Mathematics; Theoretical Population Biology, Vector-Borne Diseases & Treatment (Book Reviewer) ……

## Conference and workshop organization

- Special session organizer on "Dynamical systems with applications to population biology", 12th AIMS Conference, Taipei, July 5-9, 2018
- Stream organizer, The third International Conference on Engineering and Computational Mathematics (ECM2017), May 31-June 2, 2017
- Symposium organizer, 2015 Joint Meeting of JSMB and CJK Colloquium on Mathematical Biology, Doshisha University, Kyoto, Japan, August 26-29, 2015
- Special session organizer, The Fourth Conference on Computational and Mathematical Population Dynamics, North University of China, May 29-June 1, 2013
- Organizing committee member, 2012 Workshop on Network Transmission Dynamics, Shanghai University, December 1, 2012

- Chair of the organizing committee, 2012 CDM Incubation Day, York University, Toronto, January 24, 2012.
- Coordinator, CDM Informal Group Meetings at York, September-December, 2010
- Organizer, CDM Incubation Day of Excellence in Nonlinear Dynamics and the Life Sciences, December 1, 2010