# Kaiming (Daniel) Bi

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Google Scholar : https://scholar.google.com.au/citations?user=56ebSPAAAAAJ&hl=en

ResearchGate: https://www.researchgate.net/profile/Kaiming_Bi2

Personal Website: https://bikaiming93.github.io/

## EDUCATION

❖ **Kansas State University**, Manhattan, KS                                                                 2020

Ph.D., Industrial Engineering (Operations Research Field).

Dissertation Title "Analytics and Theoretical Studies of Complex Systems and their Applications in Epidemic Models"

❖ **Northeastern University (NEU)**, Shenyang, China                                                      2015

Bachelor of Science, Mathematics (Outstanding Graduate).

Thesis Title "Lyapunov Stability Analysis of Linear Time-delay systems"

## RESEARCH INTEREST

❖ **Modeling & Simulation**

Conducted seven different research studies using *Compartmental model, Network model, Agent-based Model, Numerical Simulation & Theoretical System analysis*. One study earned the *IISE best paper award in Modeling & Simulation Track.*

❖ **Optimization & Machine learning:**

Five of my published studies included the methodological innovations *in Optimal Control Theory, Dynamic Programming, Heuristic Algorithms, Simulation-based Optimization, Supervised Learning, and Neural Networks.*

❖ **Infectious Diseases & Epidemics:**

Mentored by four different professors with eight years modeling experience on *SARS-Cov-2, Influenzas, Zika Virus, Leishmaniasis, HIV, Ebola, Drug Epidemic*. Received *Pencis Best Researcher award on Infectious Diseases*.

## RESEARCH & WORK APPOINTMENTS

❖ **Research Postdoc associate**                                                                  Aug 2021~ Present

Oden Institute for Computational Engineering & Science and Department of Integrative Biology, UT Austin

Mentored by Dr. Lauren Ancel Meyers

*Computational Epidemiology, Evolution Biology, Network Modeling, Epidemic Control, Optimization,*

❖ **Research Postdoc associate**                                                                  Aug 2020~ Aug 2021

Division of Infectious Disease and Public Health at School of Medicine, UCSD

Mentored by Dr. Annick Borquez

*Drug Epidemic, Dynamic & Data-driven Modeling, Public Health*

❖ **Graduate Research Assistant & Department IT administrator**                      Aug 2015~ May 2020

Health Care Operation Resource Center at Industrial and Manufacturing Systems Engineering, KSU

Mentored by Dr. Chih-Hang Wu, Dr. David Ben-Arieh (Co-advisor), Supervised by Dr. Bradley Kramer (IT)

*Computational Epidemiology, Dynamic Modeling, Optimal Control, Machine Learning, Simulation*

❖ **Data Analyst Summer Intern**                                                               May 2019~Aug 2019

FedEx Service at FedEx World Headquarter, Memphis

Supervised by Deidre Thompson

*Big Data, Machine Learning, Enterprise Data Analysis*

## AWARDS AND HONORS

- ❖ Pencis Best Researcher Award: International Research Awards on Infectious Diseases    2021
- ❖ Outstanding GTA service to the IMSE department    2020
- ❖ Outstanding dissertation award at Carl R.Ice College of Engineering    2020
- ❖ IISE Annual Conference Best Paper in Modeling & Simulation    2018
- ❖ Golden Key Outstanding Graduate Research Assistant nominee    2018
- ❖ Robert I-Jen and Sophia Shui-Kan Jung Graduate Scholarship    2015
- ❖ Second Prize of China Mathematical Contest in Modeling    2013
- ❖ First Prize of Liaoning Province Mathematical Contest in Modeling    2013

## JOURNAL PUBLICATIONS

**Published:**

1. **Kaiming Bi,** Yuyang Chen, Chih-Hang (John) Wu, Davide Ben-Arieh. "A New Learning-Based Impulse Control with Event Triggered Conditions for the Epidemic Dynamic System". Communications in Nonlinear Science and Numerical Simulation (2022): 106204. IF:4.260.

2. **Kaiming Bi,** Dong Lin, Yiliang Liao, Chih-Hang (John) Wu, Pedram Rarandoush. "Additive manufacturing embraces big data." Progress in Additive Manufacturing (2021), DOI:10.1007/s40964-021-00172-8. IF:4.97.

3. **Kaiming Bi**, Yuyang Chen, Songnian Zhao, David Ben-Arieh, and Chih-Hang John Wu. "A new zoonotic visceral leishmaniasis dynamic transmission model with age-structure." Chaos, Solitons & Fractals 133 (2020): 109622. IF:9.922.

4. **Kaiming Bi**, Yuyang Chen, Chih-Hang John Wu, and David Ben-Arieh. "A Memetic Algorithm for Solving Optimal Control Problems of Zika Virus Epidemic with Equilibriums and Backward Bifurcation Analysis." Communications in Nonlinear Science and Numerical Simulation (2020): 105176. IF:4.260.

5. Yuyang Chen, **Kaiming Bi**, Chih-Hang (John) Wu, David Ben-Arieh, "A New Evidence-Based Optimal Control in Healthcare Delivery: A Better Clinical Treatment Management for Septic Patients" Computer & Industrial Engineering, November, 2019, DOI: /10.1016/j.cie.2019.106010. IF:7.18.

6. **Kaiming Bi,** Yuyang Chen, Songnian Zhao, Yan Kuang, Chih-Hang (John) Wu. "Current Visceral Leishmaniosis Research: A Research Review to Inspire Future Study", BioMed Research International, July 2018, DOI: 10.1155/2018/9872095. IF:3.411.

7. Songnian Zhao, Chih-Hang Wu, Yan Kuang, **Kaiming Bi**, Davide Ben-Arieh. "Risk Perception and Human Behaviors in Epidemics," IIE Transactions on Healthcare Systems Engineering, March, 2018, DOI: 10.1080/24725579.2018.1464085. IF 1.41.

8. **Kaiming Bi**, Yuyang Chen, Songnian Zhao, David Ben-Arieh, Chih-Hang (John) Wu. "Modeling Learning and Forgetting Processes with the corresponding impacts on Human Behaviors in Infectious Disease Epidemics," Computer & Industrial Engineering, March, 2018, DOI: /10.1016/j.cie.2018.04.035. IF:7.18.

9. Chen, Yuyang, **Kaiming Bi**, Songnian Zhao, David Ben-Arieh, and Chih-Hang John Wu. "Modeling individual fear factor with optimal control in a disease-dynamic system." Chaos, Solitons & Fractals 104 (2017): 531-545. IF:9.922.

10. Songnian Zhao, Yan Kuang, Chih-Hang Wu, David Ben-Arieh, Marcelo Ramalho-Ortigao, and **Kaiming Bi**. "Zoonotic visceral leishmaniasis transmission: modeling, backward bifurcation, and optimal control." Journal of mathematical biology 73, no. 6-7 (2016): 1525-1560. IF:2.319.

11. **Kaiming Bi**, "Aim at College-coaching Legends", Science and Technology Innovation Herald (In Chinese), ISSN 1674-098X CN 11-5640/N, 2014, (26).

12. **Kaiming Bi**, "Mathematics Modeling of Reconstructing Shredded Documents", Value Engineering (In Chinese), ISSN 1006-4311 CN 13-1085/N, 2014, (25).

**Submitted:**

13. **Kaiming Bi,** Jose Luis Herrera-Diestra, Zhanwei Du, Graham Gibson, Maureen Johnson-Leon, Lauren Meyers. "The risk of the Omicron outbreak in the Low and Middle-income countries (LMICs)". Epidemics (Under first-round Review). IF:5.324.

14. Annick Borquez, Ietza Bojorquez, Javier Cepeda, **Kaiming Bi**, Alicia Vera, Natasha Martin, Steffanie Strathdee. "Mixed-methods qualitative and modeling study estimating the feasibility and impact of providing HIV treatment and opiate agonist therapy in prison on HIV incidence among people who inject drugs in Tijuana, Mexico". Drug and Alcohol Dependence. IF:3.951.

15. **Kaiming Bi,** Jack Stone, Tommi Gaines, Aaron Lim, Charles Marks Annick Borquez. "The Contribution of drug sharing to the prescription opioids' epidemic: a dynamic modeling study with heterogeneous analysis". PNAS (Under first-round Review ). IF:11.205.

16. **Kaiming Bi,** Anass Bouchnita, Oluwaseun F Egbelowo, Spencer Fox, Michael Lachmann, Lauren Ancel Meyers. "Scenario projections for the spread of SARS-CoV-2 Omicron BA. 4 and BA. 5 subvariants in the US and Texas". Epidemics (Under first-round Review). IF:5.324.

**Working Papers:**

17. **Kaiming Bi,** Jose Luis Herrera-Diestra, Spencer Fox, Alessandro Vespihnani, Joel Miller, Lauren Meyers. "How far is the herd immunity?": A modeling-based study of vaccination-induced immunity and disease-induced immunity through the network. (In draft finalizing)

18. Yuyang Chen, **Kaiming Bi**, Chih-Hang (John) Wu, Davide Ben-Arieh. "A Computational Scheme for Stochastic Optimal Control Systems with Variance Constraint".

19. Yuyang Chen, **Kaiming Bi**, Chih-Hang (John) Wu, Davide Ben-Arieh. "A New Bayesian Optimization Algorithm for Complex High-Dimensional Disease Epidemic Systems and Related Computational Studies".

## CONFERENCE PUBLICATIONS AND POSTERS

1. Anass Bouchnita, **Kaiming Bi**, Spencer Fox, Zhanwei Du, Lauren Meyers. "Individual- and population-level immunity modulates key epidemiological characteristics of COVID-19." In the 5th Workshop on Virus Dynamics, 2021.

2. **Kaiming Bi**, Tommi Gaines, Peter Davidson, Steffanie Strathdee and Annick Borquez. "The Contribution of Drug Sharing to the Prescription Opioids' Epidemic: A Dynamic Modeling Study." In the 83rd CPDD Annual Scientific Meeting. Poster. The College on Problems of Drug Dependence (CPDD), 2021.

3. **Kaiming Bi**, Yuyang Chen, Chih-Hang Wu and David Ben-Arieh. "Prevention strategy of Zika Virus Epidemic Using Memetic Algorithm and optimal control." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2019.

4. Chen, Yuyang, **Kaiming Bi**, Chih-Hang Wu and David Ben-Arieh. "A Computational Scheme to Stochastic Optimal Control with Variance Constraint." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2019.

5. **Kaiming Bi**, Yuyang Chen, Chih-Hang Wu and David Ben-Arieh,. "An agent-based model of individual forgetting and learning behavior in Epidemics." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2018.

6. Chen, Yuyang, **Kaiming Bi**, Chih-Hang Wu and David Ben-Arieh. "A New Zoonotic Visceral Leishmaniosis Dynamic Transmission Model with Age-Structure." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2018.

7. **Kaiming Bi**, Yuyang Chen, Chih-Hang Wu, David Ben-Arieh, Songnian Zhao, and Yan Kuang. "A New Evidence Based Optimal Control (EBOC) Method for Better Sepsis Clinical Treatment." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2017.

8. Chen, Yuyang, **Kaiming Bi**, Chih-Hang Wu, David Ben-Arieh, Songnian Zhao, and Yan Kuang. "An Individual Fear Factor model for Information Transmission and Human behavior with Stability Analysis." In IISE Annual Conference. Proceedings. Institute of Industrial and Systems Engineers (IISE), 2017.

## CONFERENCE PRESENTATIONS

1. "Omicron BA 4&5 variants scenario projections in United States and Texas." Simulation Modeling Hub Meeting, 2022

2. "How past infection and vaccination differentially protect a population." Ecology & Evolution of Infectious Diseases, 2022

3. "A Novelty Evidence based Convolutional Event Trigger Control System." INFORMS Annual Conference, 2019.

4. "Dynamic Modeling, Analysis and Optimal Control in Epidemic Modeling." IMSE Graduate Seminar

5. "Quantum-based Memetic Algorithm and the applications in Optimization", IISE Annual Conference, 2019

6.  "Memetic Algorithm for Optimal Control of Zika Virus Epidemic with Bifurcation Analysis." INFORMS Annual Conference, 2018.

7.  "Agent-based model of human behavior in Epidemics." IISE Annual Conference, 2018.

8.  "New Evidence Based Optimal Control for Better Sepsis Clinical Treatment." IIE Annual Conference, 2017.

## JOURNAL REVIEW EXPERIENCE

❖ **Serve as Editor:**

*American Journal of Computer Science and Technology (Editorial Board), Epidemics (Guest editor for Simulation Modeling Hub Special Issue)*

❖ **Serve as Reviewer:**

*African Journal of Environmental Science and Technology, African Journal of Mathematics and Computer Science Research, American Journal of Operations Research, Biology, BMC Infections Diseases, Complexity, Computer & Industrial Engineering, Environmental Engineering and Management Journal, IEEE Transactions on Cybernetics, IEEE Transactions on Systems, Man and Cybernetics: Systems, Infectious Disease of Poverty, International Journal of Environmental Research and Public Health, International Journal of Mathematics and Mathematical Science, Journal of Advances in Mathematics and Computer Science, Journal of Scientific Research and Reports, Math, Plos One, Tropical Medicine and Infectious Diseases*

## TEACHING EXPERIENCE

❖ **Guest Instructor**, Integrative Biology**,** UT Austin                                              Oct 2021~Nov 2021

BIO 390E, Fundamental of Ecology & BIO 102C, Pandemic Science

Serve as a guest instructor to give two lessons about the introduction of infectious disease modeling

❖ **Lab Instructor**, IMSE, KSU                                              Aug 2018~May 2019

IMSE 643, Industrial Simulation (Fall 2018 and Spring 2019)

Teach and demonstrate 2 sessions (8 lessons), Grade homework and holding help sessions for 50 students in IMSE 643

Contents: SIMIO software, modeling of manufacturing, production, service and stochastic systems

❖ **Graduate Teaching Assistant**, IMSE, KSU                                              Aug 2015~May 2016

IMSE 881, Linear Programming (Fall 2015) and IMSE 685, Manufacturing Information Systems (Spring 2016)

Grade homework and holding help sessions for 30 students in IMSE 881 and 50 students in IMSE 643

Contents: simplex methods, duality theory, integer programming, transportation methods, PHP and HTML coding

## PROPOSAL WRITING EXPERIENCE

❖ NSF 21-590, Predictive Intelligence for Pandemic Prevention (PIPP),                                              2021

Developing Robust Paradigms for Anticipating and Mitigating Uncertain Pathogen Threats (as contributor)

❖ NSF 22-054, Incorporating Human Behavior in Epidemiological Models (IHBEM),                                              2022

Integrating psychological and social dynamics into infectious disease models (as contributor)

❖ CSTE, Development of Forecasts and Scenario Projections for Influenza to Inform Public Health Decision making,                                              2022

Promote collaborative engagement within the CDC and CSTE Influenza Forecasting Network (as contributor)

## REFERENCE

**Chih-Hang (John) Wu**
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