

# Jiyeon Suh

Postdoctoral Researcher  
Department of Environmental Health Sciences  
Columbia University Mailman School of Public Health  
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## RESEARCH INTERESTS

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- **Applied Mathematics**  
Data analysis, Optimization, Data assimilation, Uncertainty quantification
- **Mathematical Biology**  
Infectious disease modeling, Compartmental model, Agent-based model, Economic evaluation

## PROFESSIONAL EXPERIENCES

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**Columbia University, NY, USA**  
Postdoctoral Research Scientist in Environmental Health Sciences Sep 2022 – Present

- *Supervisor:* Prof. Jeffrey Shaman

## EDUCATION

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**Yonsei University, Seoul, Republic of Korea**  
*Ph.D.* in Computational Science and Engineering Mar 2016 – Aug 2022

- *Thesis:* Mathematical modeling to evaluate interventions for infectious diseases
- *Supervisor:* Prof. Jeehyun Lee

*B.S.* in Mathematics Mar 2010 – Feb 2016

## PUBLICATIONS

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Accepted / In press / Published

- [1] S. Kim, J.-K. Choi, **J. Suh**, J. Lee, and S. H. Park, “The epidemiologic and economic impact of varicella and herpes zoster vaccination in South Korea: a mathematical modelling study”, in press, *Vaccine*, 2024.
- [2] **J. Suh**, H.-D. Kwon, and J. Lee, “A model of *Plasmodium vivax* malaria with delays: Mathematical analysis and numerical simulations”, *Mathematics and Computers in Simulation*, vol. 217, pp. 169–187, 2023.
- [3] **J. Suh\***, J. H. Kim\*, J.-D. Kim, C. Kim, J. Y. Choi, J. Lee, and J. S. Yeom, “Cost-benefit analysis of tafenoquine for radical cure of *Plasmodium vivax* malaria in South Korea”, *Journal of Korean Medical Science*, vol. 37, no. 27, e212, 2022.
- [4] **J. Suh**, J.-K. Choi, J. Lee, and S. H. Park, “Estimation of single-dose varicella vaccine effectiveness in South Korea using mathematical modeling”, *Human Vaccines & Immunotherapeutics*, 2022.
- [5] **J. Suh**, T. Lee, J.-K. Choi, J. Lee, and S. H. Park, “The impact of two-dose varicella vaccination on varicella and herpes zoster incidence in South Korea using a mathematical model with changing population demographics”, *Vaccine*, vol. 39, no. 18, pp. 2575–2583, 2021.

- [6] T. Lee, **J. Suh**, J.-K. Choi, J. Lee, and S. H. Park, “Estimating the basic reproductive number of varicella in South Korea incorporating social contact patterns and seroprevalence”, *Human Vaccines & Immunotherapeutics*, pp. 1–6, 2021.
- [7] J. H. Kim\*, **J. Suh**\*, W. J. Lee, H. Choi, J.-D. Kim, C. Kim, J. Y. Choi, R. Ko, H. Kim, J. Lee, and J. S. Yeom, “Modelling the impact of rapid diagnostic tests on *Plasmodium vivax* malaria in South Korea: a cost–benefit analysis”, *BMJ Global Health*, vol. 6, no. 2, e004292, 2021.
- [8] H. Choi\*, **J. Suh**\*, W. Lee, J. H. Kim, J. H. Kim, H. Seong, J. Y. Ahn, S. J. Jeong, N. S. Ku, Y. S. Park, J. S. Yeom, C. Kim, H.-D. Kwon, D. M. Smith, J. Lee, and J. Y. Choi, “Cost-effectiveness analysis of pre-exposure prophylaxis for the prevention of HIV in men who have sex with men in South Korea: a mathematical modelling study”, *Scientific Reports*, vol. 10, no. 1, pp. 1–11, 2020.

In preparation / Submitted / In revision

- [9] H. Seong\*, **J. Suh**\*, J. Y. Choi, J. Lee, and J. S. Yeom, “Development of *Plasmodium vivax* malaria model for evaluating the effects of control strategies on the malaria burden in Democratic People’s Republic of Korea”, *submitted*.
- [10] R. Kaondera-Shava, M. Galanti, M. Perini, **J. Suh**, S. Farley, S. Chicumbe, I. Jani, A. Cassy, I. Macicame, N. Manafe, W. El-Sadr, and J. Shaman, “SARS-CoV-2 transmission dynamics in Mozambique and Zimbabwe during the first three years of the pandemic”, *submitted*.
- [11] **J. Suh**, M. Galanti, T. Yamana, M. Perini, R. Kaondera-Shava, and J. Shaman, “COVID-19 transmission dynamics in South Korea prior to vaccine distribution”, *submitted*.
- [12] M. Perini, T. Yamana, M. Galanti, **J. Suh**, R. Kaondera-Shava, and J. Shaman, “Modelling COVID-19 in the North American region with a metapopulation network and Kalman filter”, *submitted*.
- [13] H. Seong, Y. Lee, **J. Suh**, J. Lee, and J. Y. Song, “Mathematical modeling of the long-term impact of latent tuberculosis treatment in South Korea”, *in preparation*.

\* Co-first authors

## RESEARCH EXPERIENCES

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### **Integrated Master and Ph. D. Course**

Mar 2016 – Present

School of Mathematics and Computing (Computational Science and Engineering), Yonsei University, *Supervisor*: Prof. Jeehyun Lee

#### • **Modeling of *Plasmodium vivax* malaria**

- Developed a *P. vivax* malaria transmission model based on delay differential equations and performed mathematical analysis and cost-benefit analysis of rapid diagnostic tests and tafenoquine.
- Collaborated with the team of Prof. Joon-Sup Yeom in Division of Infectious Diseases, Yonsei University Severance Hospital.

- **Modeling of age structured varicella zoster virus**
  - Developed an age-stratified varicella zoster virus transmission model, assessed the impact of two-dose varicella vaccination, and estimated its effectiveness using nonlinear regression techniques. In addition, a cost-effectiveness analysis of HZ vaccination was conducted.
  - Collaborated with Prof. Sun Hee Park in Division of Infectious Diseases, The Catholic University of Korea Seoul St. Mary's Hospital.
- **Modeling of human immunodeficiency virus**
  - Developed an human immunodeficiency virus (HIV) transmission model in men who have sex with men and performed a cost-effectiveness analysis of pre-exposure prophylaxis.
  - Collaborated with the team of Prof. Jun Yong Choi in the Department of Internal Medicine and AIDS Research Institute, Yonsei University Severance Hospital.

**Undergraduate Research Program**

Mar 2015 – Feb 2016

Department of Computational Science and Engineering, Yonsei University,  
Supervisor: Prof. Eunjung Lee

- **Algorithm development for molecular diagnosis**
  - Developed numerical algorithms for determination of the baseline threshold in real-time polymerase chain reaction and discrimination of two targets in one channel in MuDT™ technology.
  - Collaborated with *Seegene*

**CONFERENCES**

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- [1] **J. Suh**, M. Galanti, T. Yamana, M. Perini, R. Kaondera-Shava, and J. Shaman, “Characterizing the distinctive epidemiological dynamics of COVID-19 in South Korea”, *Joint annual meeting of the Korean Society for Mathematical Biology and the Society for Mathematical Biology*, Seoul, Republic of Korea, July 2024. – Oral
- [2] **J. Suh**, M. Galanti, T. Yamana, M. Perini, R. Kaondera-Shava, H. Y. Wunrow, and J. Shaman, “Quantification of the unique epidemiological characteristics of COVID-19 in South Korea”, *Epidemics 9*, Bologna, Italy, November 2023. – Poster
- [3] **J. Suh**, J. H. Kim, J.-S. Yeom, and J. Lee, “Cost-benefit analysis of tafenoquine for the relapse prevention of *Plasmodium vivax* malaria in South Korea”, *Society for Mathematical Biology 2021 Annual Meeting*, Online, June 2021. – Oral
- [4] **J. Suh**, S. H. Park, and J. Lee, “Assessing the impact of two-dose varicella vaccination on varicella and herpes zoster incidences in the Republic of Korea”, *Korean Society for Industrial Applied Mathematics 2020 Annual Meeting*, pp. 113–114, Jeju, Republic of Korea, November 2020. – Oral
- [5] **J. Suh**, J. H. Kim, J.-S. Yeom, and J. Lee, “Cost-benefit analysis of rapid diagnostic tests for *Plasmodium vivax* malaria in South Korea: A mathematical modeling study”, *Korean Mathematical Society 2020 Annual Meeting*, Online, October 2020. – Oral
- [6] **J. Suh**, “The cost-effectiveness analysis of preexposure prophylaxis for HIV prevention in men who have sex with men”, *Korean Society for Industrial Applied Mathematics 2017 Annual Meeting*, Busan, Republic of Korea, November 2017. – Poster

**OTHER ACADEMIC ACTIVITIES**


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<b>18th CSE Poster Exhibition</b> , “Cost-benefit analysis of rapid diagnostic tests for <i>Plasmodium vivax</i> malaria in South Korea: A mathematical modeling study”, School of Mathematics and Computing, Yonsei University	Nov 2020
<b>Seminar</b> , “Economic evaluations of interventions for infectious disease”, Department of Pediatrics, Severance Children’s Hospital, Yonsei University College of Medicine	Sep 2020
<b>Workshop</b> , “Control and Economic Evaluation of Interventions for Infectious Diseases through Mathematical Modeling”, Department of Mathematics and Computational Science and Engineering, Yonsei University	Feb 2020
<b>Seminar</b> , “The economics of infectious disease”, Department of Internal Medicine and AIDS Research Institute, Yonsei University College of Medicine	Sep 2019
<b>Summer Bootcamp of Infectious Disease Modeling 2019</b> , Prof. Hiroshi Nishiura, Tachikawa, Tokyo, Japan	Aug 2019
<b>Medical Mathematics Modeling Summer School</b> , National Institute for Mathematical Sciences, Dajeon, Republic of Korea	July 2019
<b>CSE Poster Exhibition Joint with 2019 KSIAM Spring Conference</b> , “Age-Structured Varicella Zoster Virus Model”, Department of Computational Science and Engineering, Yonsei University	May 2019
<b>16th CSE Poster Exhibition</b> , “The Cost-Effectiveness of PrEP for HIV Prevention in MSM in Korea”, Department of Computational Science and Engineering, Yonsei University	Sep 2018
<b>Seminar</b> , “The cost-effectiveness of PrEP for HIV prevention”, Department of Internal Medicine and Preventive Medicine, Yonsei University College of Medicine	Aug 2017
<b>The 8th KIAS CAC Summer School on Parallel and Scientific Computing</b> , Korea Institute for Advanced Study, Seoul	June 2017
<b>11th CSE Poster Exhibition</b> , “UAV path-finding problem in 2D”, Department of Computational Science and Engineering, Yonsei University	Apr 2016
<b>10th CSE Poster Exhibition</b> , “Application of numerical method in MuDT™”, Department of Computational Science and Engineering, Yonsei University	Oct 2015

**CERTIFICATES**


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<b>Deep Learning Nanodegree</b> , Udacity	Jun 2018
<b>Business Analyst Nanodegree</b> , Udacity	Mar 2018
<b>Epidemiological Data Analysis Using R</b> , The Korean Society of Health Informatics and Statistics, Seoul, Republic of Korea	Feb 2018
<b>Machine Learning</b> , Prof. Andrew Ng, Stanford University, Coursera	Apr 2017

**COMPUTER SKILLS**


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MATLAB (professional), Python (proficient), R (proficient), C++ (basic), SAS (basic), Git/Github (professional), LaTeX (professional)

## OTHER SKILLS AND INTERESTS

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**Languages:** Korean (native), English (proficient)

**Soft skills:** Great communication, Highly organized, Self-management

**Interests:** Machine learning, Quantum computing

## AWARDS

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**Excellence Doctoral Thesis Award**, Yonsei University Dec 2022

**Merit Academic Paper Award**, Yonsei University Dec 2020

**CSE Best Poster Awards, The Best prize in URP**, Department of Computational Science and Engineering, Yonsei University Oct 2015

**Academic Excellence Award**, College of Science, Yonsei University Oct 2014

## SCHOLARSHIPS AND GRANTS

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**Brain Korea 21 Plus scholarship** for Yonsei Mathematical Sciences and Computation, National Research Foundation of Korea, USD 5,200 Sep 2020 – Feb 2021

**Yonsei Junior Convergence Research Group grant** for the development of numerical methods for the simulation of galaxy evolution, Institute of Convergence Science, Yonsei University, USD 2,200 Jul 2019 – Feb 2020

**Brain Korea 21 Plus scholarship** for Computational Science and Engineering, National Research Foundation of Korea, USD 70,700 Feb 2016 – Aug 2020

**National Scholarship**, Korea Student Aid Foundation, USD 10,700 Sep 2012 – Feb 2015

**Lotte scholarship**, Lotte Foundation, USD 3,600 Mar 2012 – Aug 2012

**National Excellence Scholarship (Natural Sciences and Engineering)**, Korea Student Aid Foundation, UDS 4,600 Mar 2010 – Aug 2010

## TEACHING EXPERIENCES

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**Topics in Mathematics I (MAT4105)** Teaching assistant. Covered MATLAB classes of estimating the effectiveness of vaccine by age, cost-effectiveness analysis, and sensitivity analysis. Spring 2021

**Infectious disease modeling tutorial using MATLAB** Instructor and teaching assistant. Covered a lecture and MATLAB class for economic evaluation and sensitivity analysis. Winter 2020

**Infectious disease modeling tutorial using Python** Instructor and teaching assistant. Covered a lecture and Python class for cost-effectiveness of seasonal influenza vaccination. Summer 2020

**Infectious disease modeling tutorial using R** Instructor and teaching assistant. Covered lectures and R classes for heterogeneous mixing, basic reproduction number, and economic evaluation. Winter 2019

**Infectious disease modeling tutorial using MATLAB** Instructor and teaching assistant. Covered lectures and MATLAB classes for heterogeneous mixing and basic reproduction number. Summer 2019