Nan-Hung Hsieh

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EXPERIENCE

Exposure Assessment Section, Human Health Assessment Branch, California Department of Pesticide Regulation
Staff Toxicologist 09/2022 – current

- Conducted research topic: "Applying Bayesian Physiologically-Based Kinetic Model in Biomonitoring Data-Driven Exposure Assessment of Pyrethroids Pesticides in the US Population". The research underscores the significance of the physiologically-based kinetic (PBK) model in health risk assessments and its potential applications in future studies.

  Highlights:

  - Utilized National Health and Nutrition Examination Survey (NHANES) data to assess pyrethroid exposure from 1999 to 2016.
  - Compared the PBK model with the US Environmental Protection Agency high-throughput toxicokinetic model.
  - Identified exposure trends and health risks in different age groups.
  - Provided insights into model reliability and risk assessment methodologies.

Exposure Assessment Section, Human Health Assessment Branch, California Department of Pesticide Regulation
Associate Toxicologist 07/2020 – 08/2022

- Conducting pesticide data review and exposure assessment for product registration

Department of Veterinary Integrative Biosciences, Texas A&M University
Postdoctoral Research Associate 08/2016 – 07/2020

- Participated in the research project from the US Food and Drug Administration that aims to apply the global sensitivity analysis approach to improve the computer performance in the Bayesian population physiologically based pharmacokinetic model
- Participated in the research project from the US Environmental Protection Agency to develop a multicompartment toxicokinetic model to quantitatively compare trichloroethylene and tetrachloroethylene metabolism
- Participated in the Texas A&M Superfund research project to assess the exposure risks of complex environmental mixtures by integrating the organotypic in-vitro human stem cell assay and probabilistic concentration-response modeling

Division of Occupational Hazards Assessment, Institute of Labor, Occupational Safety and Health, Ministry of Labor
Research Associate 08/2013 – 07/2016

- Conducted the research project to assess the occupational health risk in high-lead exposed factories

  Highlights:

  - Epidemiological investigated the relationship between lead exposure and anemia risk among workers in lead-related manufacturing industries.
  - Applied Benchmark dose modeling (BMD) approach to estimate the critical blood lead (BPb) levels-associated abnormal hematological indicators.
  - Utilized Bayesian decision analysis to determine whether BMD could be implicated as a suitable BPb standard.

EDUCATION

Ph.D. Bioenvironmental Systems Engineering, National Taiwan University, 2013
M.Sc. Bioenvironmental Systems Engineering, National Taiwan University, 2010
B.Sc. Safety, Health and Environmental Engineering, National United University, 2007

RESEARCH PROJECT

Postdoctoral Research Associate 04/2017–06/2020

National Institute of Environmental Health Sciences. *Texas A&M University Superfund Research Program - Comprehensive Tools and Models for Addressing Exposure to Mixtures During Environmental Emergency-Related Contamination Events*. P42 ES027704

Postdoctoral Research Associate 09/2016–06/2020

U.S. Food and Drug Administration. *Enhancing the reliability, efficiency, and usability of Bayesian population PBPK modeling - Create, implement, and evaluate a robust Global Sensitivity Analysis algorithm to reduce PBPK model parameter dimensionality*. 1U01FD005838-01.

Principle Investigator 03/2015–12/2015

Institute of Labor, Occupational Safety and Health. *Assessing the Fine Particles-Associated Exposure Hazards for Workers in Workplace*. ILOSH104-A310.

Principle Investigator 03/2014–12/2014

Institute of Labor, Occupational Safety and Health. *Assessing Health Risks for Workers in High Lead Exposed Factories*. ILOSH103-A307.

Co-PI 08/2014–12/2014

Institute of Labor, Occupational Safety and Health. *Chemicals Management and Supervision in Europe, Japan, United States and South Korea*. ILOSH103-A317.

Co-PI 08/2013–12/2013

Institute of Labor, Occupational Safety and Health. *Sampling and Analytical Method of Multicomponents Solvents for Printed Circuit Board Industry*. IOSH102-A317.

AWARDS

- Best Trainee Abstract Finalist, Biological Modeling Specialty Section, Society of Toxicology, 2019
- Outstanding R&D alternative military award, Taiwan Ministry of the Interior, 2016
- Outstanding Alumni, National United University, 2015
- Best PhD Academic Research Paper, National Taiwan University, 2012

SERVICES TO THE PROFESSION

Journal Editor

- Associated Editor - Predictive Toxicology in Frontiers in Pharmacology
- Guest Topic Editor - Research Topic "Development and utilizing computational tools to support risk assessment" in Frontiers in Pharmacology
- Editorial Board Member - Journal of Environment Pollution and Human Health

Peer review for scientific journals (count: 50+; Web of Science)

- Building and Environment
- Computational and Mathematical Methods in Medicine
- Computational Toxicology
- Chemosphere
- Environmental Chemistry Letters

- Environmental Sciencend Pollution Research
- International Journal of Environmental Research and Public Health
- International Journal of Molecular Sciences
- European Journal of Pharmaceutical Sciences
- Pharmaceutics
- Reliability Engineering and System Safety
- Science of the Total Environment
- Sustainability
- Toxicological Sciences
- Toxicon
- The Journal of Open Source Software
- The R Journal

Peer Review of USEPA Project

External Peer Review of a Report on Physiologically Based Pharmacokinetic (PBPK) Modeling for Chloroprene (Ramboll, 2020) and a Supplemental Analysis of Metabolite Clearance (U.S. EPA, 2020)(EPA-HQ-ORD-2020-0181)

Invited talk/tutorial

- Texas A&M University Superfund Research Program, Modern Open Source Tools for State-of-the-Art Risk Assessment Workshop, Dec 2019

  "Pharmacokinetic Modeling of Chemicals"

- California Department of Pesticide Regulation, Oct 2019

  "Uncertainty, Variability, and Sensitivity Analyses in Toxicological Modeling"

- Big Data Working Group (Texas A&M), May 2019

  "Applying Global Sensitivity Analysis in Bayesian Population Physiologically Based Kinetic Modeling"

- California Office of Environmental Health Hazard Assessment, April 2019

  "Tutorial of GNU MCSim and R in Pharmacokinetic Modeling"

- Toxicology Seminar (VTPP 681, Texas A&M), September 2018

  "Applying a Global Sensitivity Analysis Workflow to Improve the Computational Efficiencies in Physiologically-Based Pharmacokinetic Modeling"

COMPUTER INTERESTS

- Operating System: GNU Linux; Windows Subsystem for Linux
- Scientific computing: R, GNU MCSim

OTHER

- Membership: Society of Toxicology, Toastmaster
- Language: Mandarin Chinese (Native), English
- Personal Interests: Software development, Open science, Probabilistic programming

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PUBLICATIONS

Software Product

Hsieh NH, Reisfeld B, Chiu WA. pksensi: Global Sensitivity Analysis in Physiologically Based Kinetic Modeling. R package. [CRAN] [GitHub]

Journal Article

2024

Hsieh NH*, Kwok ES. Applying Bayesian Physiologically-Based Kinetic Model in Biomonitoring Data-Driven Exposure Assessment of Pyrethroids Pesticides in the US Population. To be submitted to Journal of Exposure Science and Environmental Epidemiology.

2023

Mozaffari S, Bayatian M, **Hsieh NH**, Khadem M, Garmaroudi AA, Ashrafi K, Shahtaheri SJ*. Reconstruction of exposure to methylene diphenyl-4, 4'-diisocyanate (MDI) aerosol using computational fluid dynamics, physiologically based toxicokinetics and statistical modeling. Inhalation Toxicology. 2023 Oct 15;35(11-12):285-99. https://doi.org/10.1080/08958378.2023.2285772 2022

Luo YS*, Chen Z, **Hsieh NH**, Lin, TE. Chemical and biological assessments of environmental mixtures: A review of current trends, advances, and future perspectives. Journal of Hazardous Materials. 2022. 128658. https://doi.org/10.1016/j.jhazmat.2022.128658

2021

Hsieh NH, Bois FY, Tsakalozou E, Ni Z, Yoon M, Sun W, Klein M, Reisfeld B, Chiu WA*. A Bayesian population physiologically based pharmacokinetic absorption modeling approach to support generic drug development: application to bupropion hydrochloride oral dosage forms. Journal of pharmacokinetics and pharmacodynamics. 2021 Dec;48(6):893-908. https://doi.org/10.1007/s10928-021-09778-5

Hsieh NH, Chen Z, Rusyn I, Chiu WA*. Risk Characterization and Probabilistic Concentration–Response Modeling of Complex Environmental Mixtures Using New Approach Methodologies (NAMs) Data from Organotypic in Vitro Human Stem Cell Assays. Environmental Health Perspectives 2021 Jan 4;129(1):017004. https://doi.org/10.1289/EHP7600

2020

Hsieh NH, Reisfeld B, Chiu WA*. pksensi: An R package to apply global sensitivity analysis in physiologically based kinetic modeling. SoftwareX. 2020 Jul 1;12:100609. https://doi.org/10.1016/j.softx.2020.100609

Bois FY, **Hsieh NH**, Gao W, Chiu WA*, Reisfeld B. Well-tempered MCMC simulations for population pharmacokinetic models. Journal of Pharmacokinetics and Pharmacodynamics. 2020 Jul 31:1-7. https://doi.org/10.1007/s10928-020-09705-0

2019

Luo YS, Cichocki JA, **Hsieh NH**, Lewis L, Threadgill DW, Chiu WA*, Rusyn I*. Using Collaborative Cross mouse population to fill data gaps in risk assessment: a case study of population-based analysis of toxicokinetics and kidney toxicodynamics of tetrachloroethylene. Environmental Health Perspectives 2019 Jun27;127(6):067011. https://doi.org/10.1289/EHP5105

Blanchette AD, Grimm FA, Dalaijamts C, **Hsieh NH**, Ferguson K, Luo YS, Rusyn I, Chiu WA. *Thorough QT/QTc in a dish: an* in vitro* human model that accurately predicts clinical concentration-QTc relationships. Clinical Pharmacology & Therapeutics. 2019 May;105(5):1175-86. https://doi.org/10.1002/cpt.1259

Li YC, Tseng WC, **Hsieh NH**, Chen SC*. Assessing the seasonality of occupancy number-associated CO_2 level in a Taiwan hospital. Environmental Science and Pollution Research. 2019 Jun 1;26(16):16422-32. https://doi.org/10.1007/s11356-019-05084-3

2018

Luo YS, **Hsieh NH**, Chiu WA, Rusyn I*. Comparative analysis of metabolism of trichloroethylene and tetrachloroethylene among tissues and mouse strains. Toxicology 2018 Nov; 409(1): 33-43. https://doi.org/10.1016/j.tox.2018.07.012 (co-first author)

Grimm FA, Blanchette A, House JS, Ferguson K, **Hsieh NH**, Dalaijamts C, Wright AA, Anson B, Wright FA, Chiu WA, Rusyn I*. A human population-based organotypic *in vitro* model for cardiotoxicity screening. ALTEX 2018 Oct; 35(4): 441-52. https://doi.org/10.14573/altex.1805301

Cheng YH, Lin YJ, Chen SC*, You SH, Chen WY, **Hsieh NH**, Yang YF, Liao CM*. Assessing health burden risk and control effect on dengue fever infection in southern region of Taiwan. Infection and Drug Resistance 2018 Sep; 11: 1423-35. https://doi.org/10.2147/IDR.S169820

Hsieh NH, Reisfeld B, Bois FY, Chiu WA*. Applying a global sensitivity analysis workflow to improve the computational efficiencies in physiologically-based pharmacokinetic modeling. Frontiers in Pharmacology 2018 Jun; 9:588. https://doi.org/10.3389/fphar.2018.00588

Cheng YH, Chou WC, Yang YF, Huang CW, How CM, Chen SC, Chen WY, **Hsieh NH**, Lin YJ, You SH, Liao CM*. PBPK/PD assessment for Parkinson's disease risk posed by airborne pesticide paraguat exposure. Environmental Science and Pollution Research 2018 Feb; 25(6):5359-68. https://doi.org/10.1007/s11356-017-0875-4

2017

Hsieh NH, Lin YJ, Yang YF, Liao CM*. Assessing the oseltamivir-induced resistance risk and implications for influenza infection control strategies. Infection and Drug Resistance 2017 Jul; 10: 215-26. https://doi.org/10.2147/IDR.S138317

Cheng YH, You SH, Lin YJ, Chen SC, Chen WY, Chou WC, **Hsieh NH**, Liao CM*. Mathematical modeling of postcoinfection with influenza A virus and Streptococcus pneumoniae, with implications for pneumonia and COPD-risk assessment. International Journal of Chronic Obstructive Pulmonary Disease 2017 Jul; 12:1973-88. https://doi.org/10.2147/COPD.S138295

Lin YJ, Ling MP*, Chen SC, Chen WY, **Hsieh NH**, Cheng YH, You SH, Chou WC, Lin MC, Liao CM*. Mixture risk assessment due to ingestion of arsenic, copper, and zinc from milkfish farmed in contaminated coastal areas. Environmental Science and Pollution Research: 2017 Jun; 24(17):14616-26. https://doi.org/10.1007/s11356-017-8982-9

Hsieh NH, Chung SH, Chen SC, Chen WY, Cheng YH, Lin YJ, You SH, Liao CM*. Anemia risk in relation to lead exposure in lead-related manufacturing. BMC Public Health 2017 May; 17:389. https://doi.org/10.1186/s12889-017-4315-7

2016

Chen WY*, Chen ZY, **Hsieh NH**, Ju YT. Site-specific water quality criteria for lethal/sublethal protections of freshwater fish exposed to zinc in southern Taiwan. Chemosphere 2016 Sep; 159:412-9. https://doi.org/10.1016/j.chemosphere.2016.06.027

Cheng YH, Wang CH, You SH, **Hsieh NH**, Chen WY, Chio CP, Liao CM*. Assessing coughing-induced influenza droplet transmission and implications for infection risk control. Epidemiology and Infection 2016 Jan; 144(2):333-45. https://doi.org/10.1017/S0950268815001739

2015

Chen WY, Cheng YH, **Hsieh NH**, Wu BC, Chou WC, Ho CC, Chen JK, Liao CM*, Lin P*. Physiologically-based pharmacokinetic modeling of zinc oxide nanoparticles and zinc nitrate in mice. International Journal of Nanomedicine 2015 Oct; 10:6277-6292. https://doi.org/10.2147/IJN.S86785

Liao CM*, Wu BC, Cheng YH, You SH, Lin YJ, **Hsieh NH**. Ceramics manufacturing contributes to ambient silica air pollution and burden of lung disease. Environmental Science and Pollution

Research 2015 Oct; 22(19):15067-79. https://doi.org/10.1007/s11356-015-4701-6

Chen SC, **Hsieh NH**, You SH, Wang CH, Liao CM*. Behavioural response in educated young adults towards influenza A(H1N1)pdm09. Epidemiology and Infection 2015 Jul; 143(9):1846-57. https://doi.org/10.1017/S0950268814002714

Liao CM*, Huang TL, Cheng YH, Chen WY, **Hsieh NH**, Chen SC, Chio CP. Assessing dengue infection risk in southern region of Taiwan and implications for control. Epidemiology and Infection 2015 Apr; 143(5):1059-72. https://doi.org/10.2147/IDR.S169820

Liao CM*, Huang TL, Lin YJ, You SH, Cheng YH, **Hsieh NH**, Chen WY. Regional response of dengue fever epidemics to interannual variation and related climate variability. Stochastic Environmental Research and Risk Assessment 2015 Mar; 29(3):947-58. https://doi.org/10.1007/s00477-014-0948-6

2014

Hsieh NH, Cheng YH, Liao CM*. Changing variance and skewness as leading indicators for detecting ozone exposure-associated lung function decrement. Stochastic Environmental Research and Risk Assessment 2014 Dec; 28(8):2205-16.

Hsieh NH, Liao CM*. In vitro measurement and dynamic modeling-based approaches for deposition risk assessment of inhaled aerosols in human respiratory system. Atmospheric Environment 2014 Oct; 95:268-76.

2013

Hsieh NH, Liao CM*. Fluctuations in air pollution give risk warning signals of asthma hospitalization. Atmospheric Environment 2013 Aug; 75:206–16.

Hsieh NH, Liao CM*. Assessing exposure risk for dust storm events-associated lung function decrement in asthmatics and implications for control. Atmospheric Environment 2013 Apr; 68:256–64.

2012

Liao CM*, Cheng YH, Lin YJ, **Hsieh NH**, Huang TL, Chio CP, Chen SC, Ling MP. A Probabilistic transmission and population dynamic model to assess tuberculosis infection risk. Risk Analysis 2012 Aug; 32(8): 1420–32.

Chio CP, Chen WY, Chou WC, **Hsieh NH**, Ling MP, Liao CM*. Assessing the potential risk to zebrafish posed by environmentally copper and silver nanoparticles. Science of the Total Environment 2012 Mar; 420: 111–8.

Liao CM*, **Hsieh NH**, Huang TL, Cheng YH, Lin YJ, Chio CP, Chen SC, Ling MP. Assessing trends and predictors of tuberculosis in Taiwan. BMC Public Health 2012 Jan; 12:29.

2011

Liao CM*, **Hsieh NH**, Chio CP. Fluctuation analysis-based risk assessment for respiratory virus activity and air pollution associated asthma incidence. Science of the Total Environment 2011 Aug; 409: 3325–33.

Liao CM*, Chio CP, Cheng YH, **Hsieh NH**, Chen WY, Chen SC. Quantitative links between arsenic exposure and influenza A (H1N1) infection-associated lung function exacerbations risk. Risk Analysis 2011 Aug; 31(8): 1281–94.

Ling MP, Chio CP, Chou WC, Chen WY, **Hsieh NH**, Lin YJ, Liao CM*. Assessing the potential exposure risk and control for airborne titanium dioxide and carbon black nanoparticles in the workplace. Environmental Science and Pollution Research 2011 Jul; 18(6): 877–89.

2010

Liao CM*, **Hsieh NH**, Chio CP, Chen SC. Assessing the exacerbations risk of influenza-associated chronic occupational asthma. Risk Analysis 2010 Jul; 30(7): 1062–75.

Liao CM*, Lin TL, **Hsieh NH**, Chen WY. Assessing the arsenic-contaminated rice (Oryza sativa) associated children skin lesions. Journal of Hazardous Materials 2010 Apr; 176(1–3): 239–51.

Conference Paper

Hsieh NH. Bayesian Population Analysis of Age-Related Physiologically Based Pharmacokinetic Model of Pyrethroids in Rats. 60th SOT Annual Meeting, Baltimore, USA, March 12–26, 2021.

Hsieh NH, Bois FY, Tsakalozou E, Yoon M, Reisfeld B, Chiu WA. A Bayesian population compartmental absorption and transit modeling approach to support generic drug development: application to bupropion hydrochloride oral dosage forms. 11th American Conference on Pharmacometrics, virtual, November 9-13, 2020.

Hsieh NH, Chen Z, Rusyn I, Chiu WA. Concentration-response modeling of in vitro bioactivity data from complex mixtures of priority Superfund compounds. 2019 SRP Annual Meeting, Seattle, USA, November 18–20, 2019.

Reisfeld B, Chiu WA, **Hsieh NH**, Olschanowsky C, Bois FY, Ghosh S. PoPKAT: A framework for Bayesian population PBPK analysis. 58th SOT Annual Meeting, Baltimore, USA, March 10–14, 2019.

Hsieh NH, Reisfeld B, Chiu WA. pksensi: an R package to apply sensitivity analysis in pharmacokinetic modeling. 58th SOT Annual Meeting, Baltimore, USA, March 10–14, 2019.

Hsieh NH, Reisfeld B, Bois FY, Chiu WA. Applying a global sensitivity analysis workflow to improve computational efficiencies in physiologically-based pharmacokinetic model. 57th SOT Annual Meeting, San Antonio, USA, March 11-15, 2018.

Hsieh NH, Reisfeld B, Bois FY, Chiu WA. Applying A global sensitivity analysis workflow to improve computational efficiency in physiologically-based pharmacokinetic modeling. 2017 SRA Annual Meeting, Arlington, USA, December 10-14, 2017.

Hsieh NH, Chung SH. Meta-analysis of the fine particulate matters-associated occupational health risks. SOT 56th Annual Meeting, Baltimore, USA, March 12–16, 2017.

Hsieh NH, Liao CM. Modeling honey bee extinction risk by neonicotinoid insecticide (imidacloprid) exposure. SETAC Europe 26th Annual Meeting, Nantes, France, May 22–26, 2016.

Hsieh NH, Liao CM. Fluctuating air pollution-associated asthma incidence in Taiwan. SETAC Europe 23rd Annual Meeting, Glasgow, UK, May 12–16, 2013.

Hsieh NH, Chio CP, Liao CM. Assessing the risks for aquatic organisms posed by waterborne copper and silver nanoparticles. SETAC Europe 21st Annual Meeting Milan, Italy, May 15–19, 2011.