

# Yi-Hsuan (Roger) Chen

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## Summary

Dynamic data analyst with expertise in GIS analysis and statistical analysis, honed at Johns Hopkins University and CommonSpirit Health. More than five years of leveraging R, Python, and ArcGIS for impactful data visualizations and spatial analyses, driving insights into public health outcomes. Adept at collaborating with cross-functional teams to enhance data-driven decisionmaking and improve community health initiatives. Please visit my [GitHub portfolio](#) for my project experiences!

## Education

<b>Sc.M.</b>	<b>Johns Hopkins University, Baltimore, USA</b> <b>Department of Environmental Health Engineering</b>	<b>Aug. 2022 – May. 2024</b>
<b>M.Sc.</b>	<b>National Cheng Kung University, Tainan, Taiwan</b> <b>Department of Resources Engineering</b>	<b>Sep. 2017 – Aug. 2019</b>
<b>B.Sc.</b>	<b>National Cheng Kung University, Tainan, Taiwan</b> <b>Department of Resources Engineering</b>	<b>Sep. 2013 – Jun. 2017</b>

## Skills

- Programming language: R, Python, SQLite, SAS, MATLAB, Excel
- Statistical Analysis & Modeling: Regression (linear, logistic, Poisson), Bayesian statistics (INLA), Time series (ARIMA), General Estimating Equation.
- Data Science & Machine Learning: Decision Tree, Random forests, K-Means clustering, PCA.
- GIS & Spatial Analysis: Spatial clustering, Geostatistics, Remote sensing, Google Earth Engine.
- Visualization & Dashboarding: ESRI, RShiny, ggplot2, highcharter, Tableau.

## Project Experience

<b>Intern</b> <b>CommonSpirit / Digital Health</b>	<b>Sep. 2024 – Present</b>
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Project: Mapping out the climatic data and patients records in Tennessee and Nebraska

- Using ArcGIS to map out the overlap of climatic indices downloaded from Policy Map and patients records from CommonSpirit, observing the relationship between each other on the geographical distribution.

<b>Research Data Analyst</b>	<b>Jul. 2024 – Present</b>
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**Johns Hopkins University, Department of Epidemiology / Spatial Science for Public Health Center**

Project: Evaluation of the co-influence of green coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore city

- Compiled and refined extensive open-source datasets including crime, satellite, and environmental data, alongside social indicators; applied statistical analyses to address data complexities, identifying outliers, and examining collinearity (Zero-Inflated Poisson (ZIP) models).
- Employed spatiotemporal analysis and crafted visualizations to display weekly crime trends and parameter relationships (R-INLA model, plotly, highcharter, and ggplot2).
- Draft the manuscript and publication

**Research Assistant**

**Nov. 2023 – May. 2024**

**Johns Hopkins University, Department of Environmental Health Engineering**

Project: Evaluating the Co-Influence of Temperature and Vegetation Cover on Crime Rate: A Case Study of Baltimore City

- Compiled and refined extensive open-source datasets including crime, satellite, and temperature data, alongside socioeconomic indicators; applied data cleaning techniques in R (multilevel imputation, regression imputation, and dichotomous variable).
- Clean missing data estimation spatially; adjusted the resolution of the data (linear interpolation, inverse distance weighted method, and population-weighted average method).
- Applied advanced statistical analyses to address data complexities, identifying outliers, and examining collinearity (Variance Inflation Factor, stepwise method, ZIP models, leave-one-out cross-validation, and Moran's I).
- Employed spatiotemporal analysis and crafted visualizations to display daily crime trends and parameter relationship.

**Research Assistant**

**Mar. 2023 – May. 2024**

**Johns Hopkins University, Department of Epidemiology**

**Spatial Science for Public Health Center / Environmental influences on Child Health Outcomes (ECHO)**

Project: ECHO Data Analysis Center Atlas

- Used ArcGIS Pro to create and modify the ECHO dashboard, a web-based mapping platform that summarizes ECHO's Five Health Outcomes and related exposure variables.

Project: ECHO-COVID-HIV geospatial project

- Used non-traditional epidemiological approaches to summarize social determinants of health at the district level; assessed criterion validity on health outcomes, including COVID-19 and HIV.
- Implemented an innovative approach to disaggregate area-level data using geostatistical techniques and project it onto hexagonal units, thereby establishing more precise units for neighborhood-level analysis.

**Research Assistant**

**May. 2020 – Jul. 2022**

**National Taiwan University College of Public Health, Institute of Epidemiology and Preventive Medicine**

Project: Build up the Taiwan Burden of Disease Center (TBDC)

- Utilized R to analyze disease prevalence and mortality rates from Taiwan's National Health Insurance Research Database (2000-2015). Calculate DALYs for each disease by age and gender across Taiwan regions, using GBD-recommended disability weights and life tables.
- Analyzed annual patient survival compared to the death registry and categorized diseases by diagnostic codes to define the cohort.
- Developed R-Shiny dashboards to display health metrics for TBDC.

Project: Assessing the Health and Economic Impacts due to Disease and Risk Factors in Taiwan

- Applied the GBD-recommended relative risk table to calculate population attributable fractions (PAFs) for each risk factor, incorporating a novel approach of sampling relative risk values under a normal distribution to estimate PAFs at the smallest geographic levels.
- Following sampling, these sorted estimates were aggregated to larger geographic units to generate precise point estimates and confidence intervals, enhancing the accuracy and interpretability of health impact assessments across varied spatial scales.

Project: Assessing health and economic benefits of air pollution reduction policies in Taiwan

- Integrated township-level PM2.5 data into broader county and city-level exposure metrics using a population-weighted average approach and assessed the attributable disease burden from 2000 to 2015 through random sampling based on the normal distribution of relative risks.
- Forecasted future PM2.5 concentrations up to 2050 under various policy scenarios using a log-linear model and predicted the rate of non-attributable disease burden for each disease using the ARIMA model.

**Research Assistant**

**Sep. 2016 – Mar. 2019**

**National Cheng Kung University, Department of Resources Engineering**

Project: The hydrological characteristics of Hehuan Mountain watershed and impact assessment of climate variation

- Implemented linear models in MATLAB to impute missing rainfall data.
- Applied the SWAT-MODFLOW model in ArcGIS to simulate interactions between surface water and groundwater.
- Conducted Fourier transform fractal analysis on each hydrological component and rainfall using MATLAB.

Project: Investigation of potential sites for geological storage of carbon dioxide in the land and sea areas of central Taiwan and development planning for carbon storage

- Established initial and boundary conditions based on reference values from the geological storage site.
- Employed TOUGH2 for simulating carbon dioxide storage and leakage phenomena.

## Teaching Experience

**Teaching Assistant**

**Mar. 2024 – May. 2024**

**Johns Hopkins University, Department of Epidemiology**

Class: Spatial Analysis IV: Spatial Design and Application

- Help the teaching team with grading, solve students' in-class problems, and assist each student in completing the capstone. The teaching scope includes geostatistics, point pattern analyses, and area-level analysis.

## Publication

- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2025, Evaluation of the co-influence of green coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore City, *Social Science & Medicine*. (submission invited)
- Sun C. Y., Y. Tesfaigzi, G. Y. Lee, R. Y. H. Chen\*, S. Weiss, K. S. K. Ma, 2024, Effectiveness and Safety of Dupilumab in Chronic Obstructive Pulmonary Disease Patients, *JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY*, doi: 10.1016/j.jaci.2024.09.019.
- Lo W. C., M. Y. Wu, Y. H. R. Chen\*, M. S. Wu, C. S. Wong, 2024, Trajectories of Metabolic Risk Clusters and Adverse Outcomes in Patients with Chronic Kidney Disease, *JOURNAL OF RENAL NUTRITION* (Revised).
- Cheng S. Y., Y. H. R. Chen\*, B. Sleep, 2024, Numerical Investigation of NAPL Depletion and Back Diffusion Mitigation Through In-Situ Persulfate Oxidation. *J Hazard Mater*. (Submitted).
- Chen R. Y. H. \*, F. W. Tsao, H. C. Shih, W. C. Lo, C. C. Ho, J. -S. Hwang, H. W. Ma, H. H. Lin, 2024, Geographical Differences and Health Implications of PM<sub>2.5</sub> Exposure: Evaluating Future Scenarios and Cross-Disciplinary Policies, *Science of The Total Environment* (Submitted).
- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2024, Evaluation of the co-influence of green coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore city (Extended abstract accepted by IMGS special issue).
- Chen R. Y. H. \*, W. C. Lee, B. C. Liu, P. C. Yang, C. C. Ho, J. S. Hwang, T. H. Huang, H. H. Lin, W. C. Lo, 2023, Quantifying the potential effects of air pollution reduction on population health and health expenditure in Taiwan. *Environmental Pollution*, 122405.
- Chen R. Y. H. \*, H. W. Tseng, S. Y. Chen, P. S. Yu, L. C. Chiang, K. C. Hsu, 2023, Evaluation of hydrological responses to climate change for a data-scarce mountainous watershed in Taiwan. *Journal of Water and Climate Change*, 14(5), 1447-1465.
- Yeh T. L, R. Y. H. Chen\*, M. C. Tsai, H. Y. Hsu, Y. C. Wu, H. H. Lin, K. L. Chien, 2023, The cardiovascular disease burden attributable to high body mass index in Taiwan. *Acta Cardiologica Sinica*, 39(4), 628.
- Chen R. Y. H. \*, Liu B. C. \*, W. C. Lo, H. H. Lin, 2021, "After the expansion of vaccination, is there a chance that Taiwan's COVID-19 mortality rate, which is higher than the world average, will drop?" *The News Lens*.
- Modelling vaccination prioritization strategies for COVID-19 in Taiwan (as a report to the National Health Research Institutes, 2021)
- Chen R. Y. H. \*, B. T. Wang, K. C. Hsu, 2019, Effectiveness evaluation and leakage simulation of carbon dioxide storage-Taking Yonghe Mountain site as an example. *Taiwan Mining*, 71(1), 12-22.

## Conference abstract

- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2024, Poster #474, Evaluation of the co-influence of green

coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore City, **International Society of Exposure Science (ISES-2024)**, Montreal, Canada.

- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2024, Poster #4, Evaluation of the co-influence of green coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore City, **2024 NIEHS EHSCC P30 Meeting**, Baltimore, Maryland, USA.
- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2024, Oral presentation, Evaluation of the co-influence of green coverage, social factors, and neighborhood factors on crime rate - a case study of Baltimore City, **Community Engagement Environmental Justice & Health (2024 10<sup>th</sup> CEEJH) annual symposium**, Baltimore, Maryland, USA.
- Chen R. Y. H. \*, Michael D. \*, M. Oberdier, D. Minor-Terrell, D. Waugh, B. Corpuz, B. Zaitchik, K. Aune, G. Smith, S. Milletich, K. Koehler, 2024, Oral presentation, Evaluation of the co-influence of heat index, social vulnerability index, and neighborhood factors on crime rate - a case study of Baltimore City, **International Medical Geography Symposium (IMGS-2024)**, Atlanta, Georgia, USA.
- Chen R. Y. H. \*, W. C. Lo\*, B. C. Liu, P. C. Yang, C. C. Ho, J. S. Hwang, W. C. Lee, H. H. Lin, 2023, Oral presentation, Assessing the Impact of Air Pollution Reduction on Population Health and Healthcare Expenditure in Taiwan, **International Conference on Pollution Control & Sustainable Environment (ICPCSE-2023)**, Boston, Massachusetts, USA.
- Chen R. Y. H. \*, W. T. Tseng, S. Y. Chen, P. S. Yu, K. C. Hsu, 2019, Poster, The hydrological characteristics of Hehuan Mountain watershed and impact assessment of climate variation, **Vienna Soil and Water Assessment Tool Conference**, Vienna, Austria.
- Chen R. Y. H. \*, K. C. Hsu, W. T. Tseng, C. C. Ke, Y. T. Lin, 2018, Poster, Natural hydrological responses due to climate variation based on short-time series of a headwater catchment in Taiwan, **Brussels Soil and Water Assessment Tool Conference**, Brussels, Belgium.
- Chen R. Y. H. \*, K. C. Hsu, W. T. Tseng, C. C. Ke, Y. T. Lin, 2018, Poster, Natural hydrological responses due to climate variation based on short-time series of a headwater catchment in Taiwan, **The 10<sup>th</sup> Groundwater Resources and Water Quality Protection Seminar and 2018 Cross-Strait Groundwater and Hydrogeological Application Conference**, Taoyuan, Taiwan.
- Chen R. Y. H. \*, K. C. Hsu, 2017, Effectiveness Evaluation and Leakage Simulation of Carbon Dioxide Storage-Taking Yonghe Mountain Site as an Example, **Chinese Institute of Mining and Metallurgical Engineers**, Miaoli, Taiwan.

## Awards

- 2024 Master's Candidate Dedication Award at Johns Hopkins University (May. 2024)
- 2024 Geyh-Bouwer Trainee Practice Award nominee (May. 2024)
- 2024 University Experiential Learning Outstanding Graduate Student Award - Student Employee of the Year nominee (Apr. 2024)
- 2024 SOURCE Community Service Award – Individual Student category nominee (Apr. 2024)
- 2023-2024 CHARMED Pilot Project Funding grant recipient (Nov. 2023)
- FY24 Endowed Student Support Fund recipient of the Bloomberg School of Public Health (Jul. 2023)
- MOST funding to attend international conferences (MOST-108-2922-I-006-111) (Jul. 2019)
- Proposing academic report in Moscow funded by MOST (MOST 105-2923-M-006-004-MY3) (Jul. 2018)