

Engineering the Future of Environmental Health

Using massive datasets to decode the impacts of climate change, protect vulnerable populations, and drive sustainable national policy.



Climate change is fundamentally a public health crisis



Our absolute focus: The impact and adaptation of human health under global environmental change.



Environmental Epidemiology

Quantifying invisible risks through precise exposure tracking



Big Data Analytics

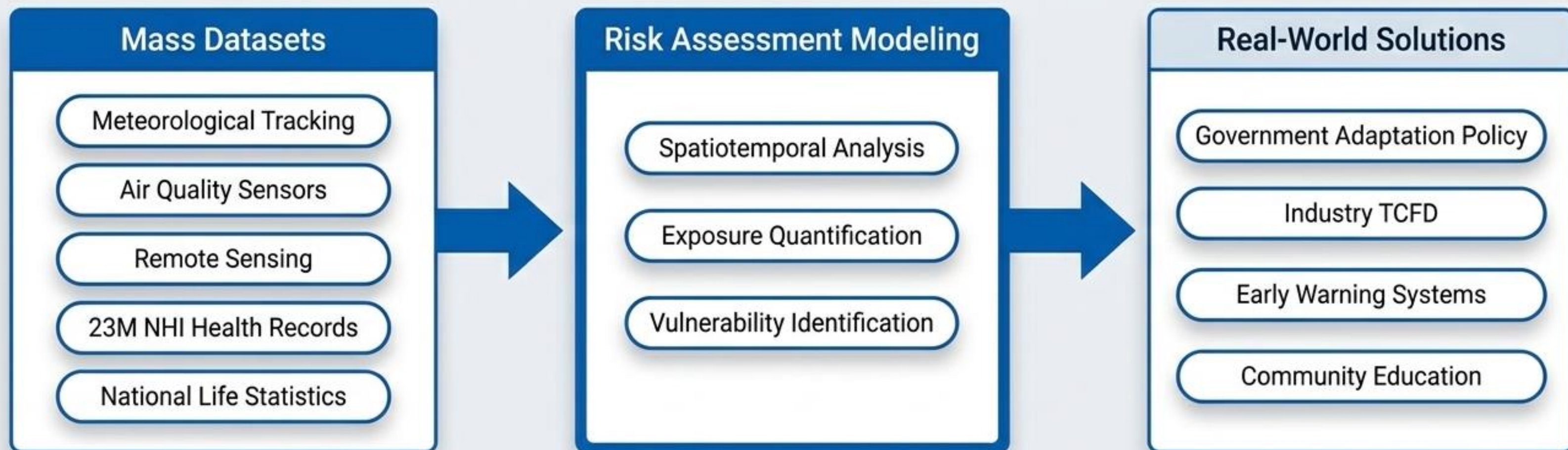
Merging 23 million National Health Insurance (NHI) records with meteorological and remote sensing data.



Actionable Policy

Transforming risk models into early warning systems and corporate adaptation strategies.

Transforming massive national datasets into actionable survival metrics



Join a lab where your code and analytical models directly shape national climate adaptation.

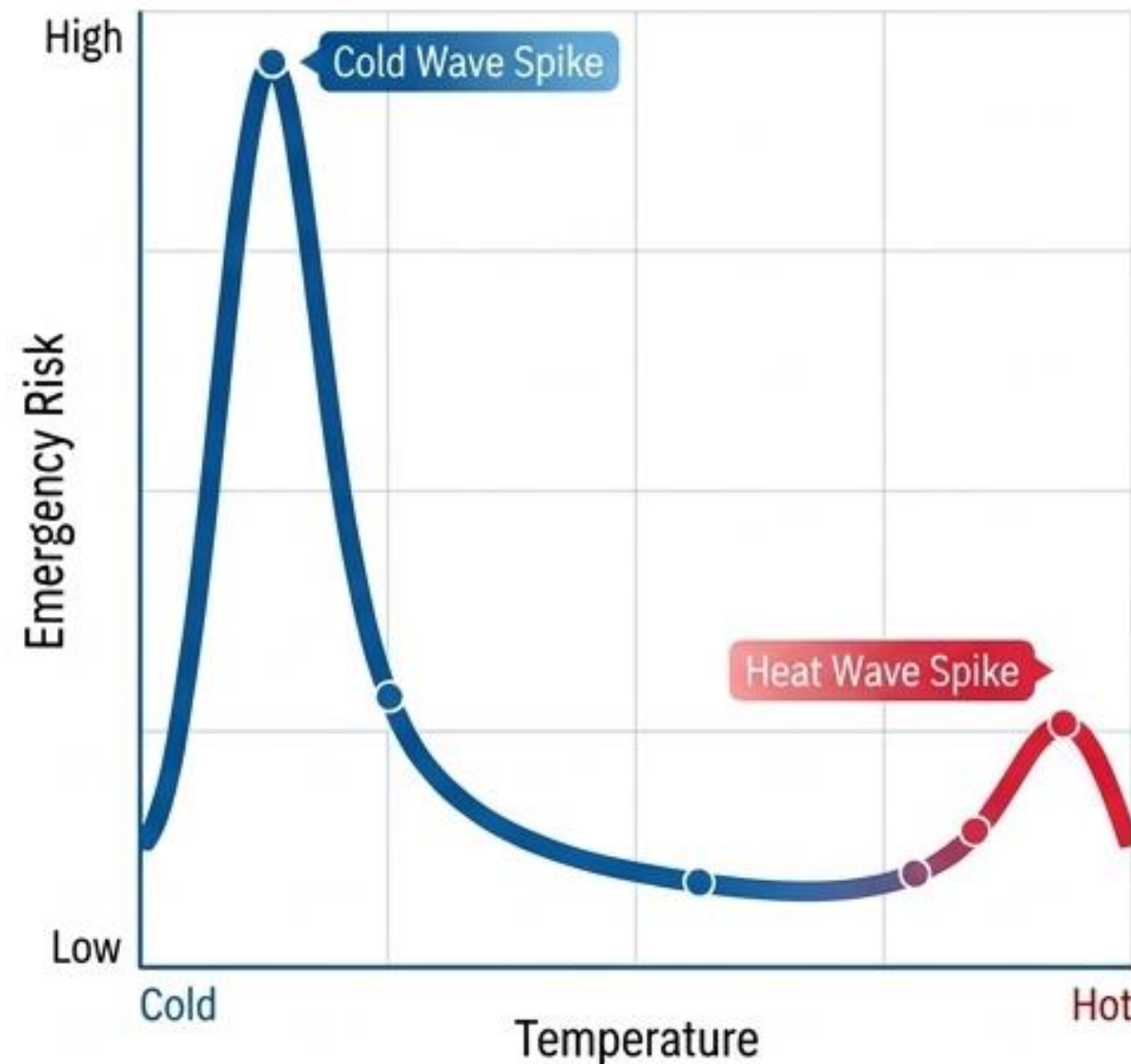
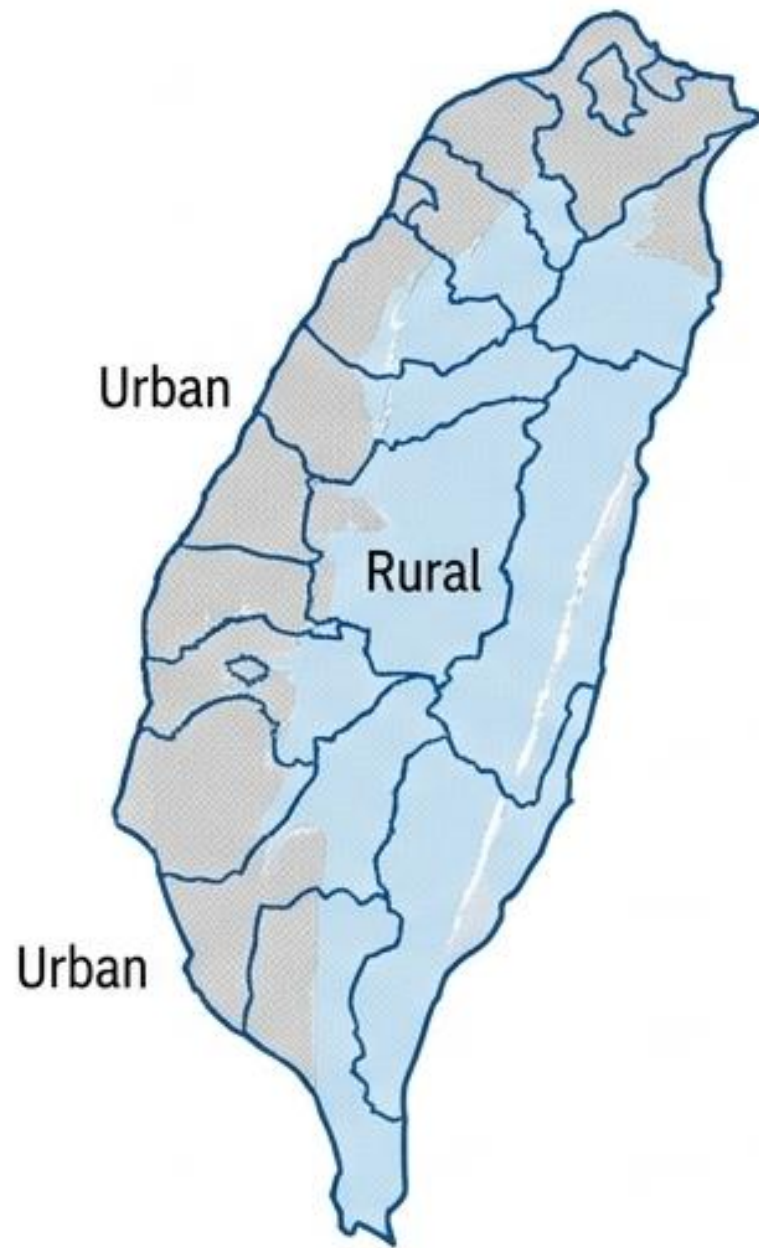
A multi-disciplinary research ecosystem built on five core axes

A track record of impact

Over **77** published journal papers and **60** major research grants. **Where will your thesis fit in?**



Extreme temperatures present counter-intuitive risks in subtropical climates



The Core Insight

In subtropical Taiwan, cold waves consistently cause higher excess health losses than heatwaves. Risk spikes during delayed or first-of-the-year extreme temperature events.

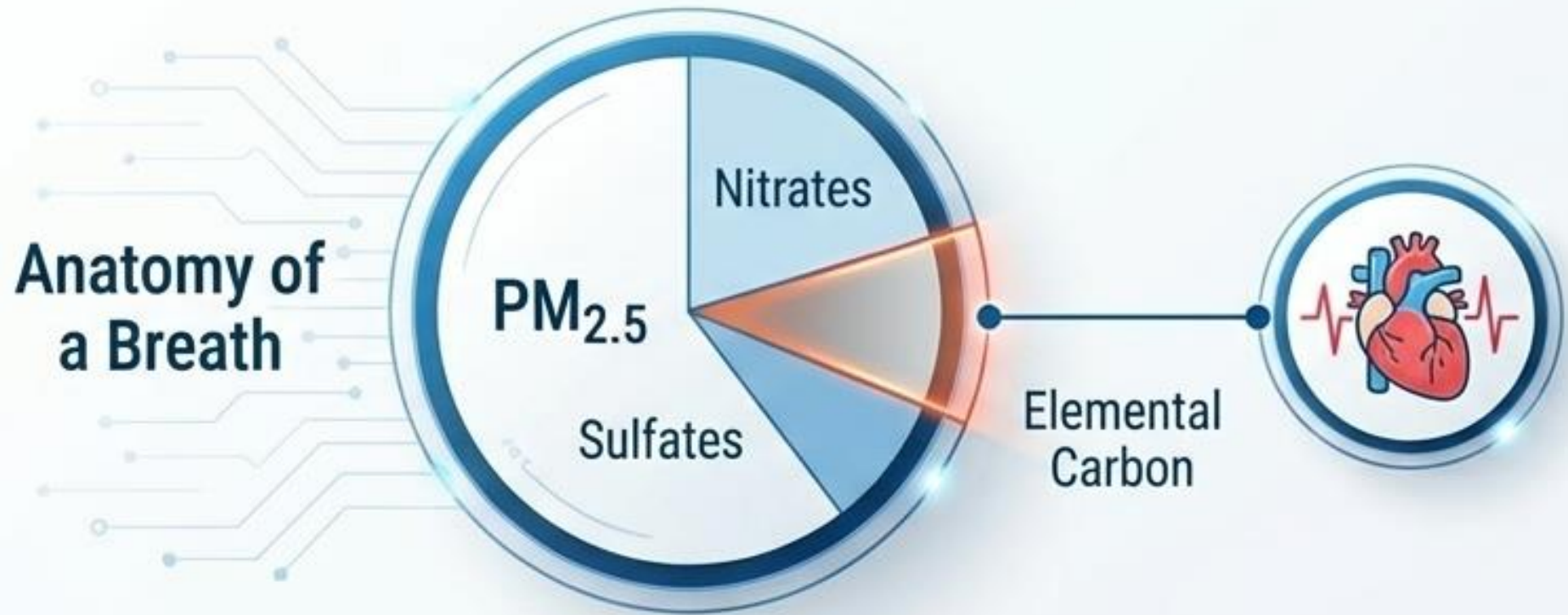
Exposure Metrics

Moving beyond daily averages to Biometeorological Indices (Wet-Bulb Globe Temperature, Apparent Temperature) tailored for urban vs. rural zones.

Target Vulnerabilities

Cardiovascular, respiratory, renal, and cerebrovascular diseases; specific focus on the elderly and co-morbid populations.

Air pollution risk is defined by chemical composition, not just mass concentration



The Core Insight

Different PM_{2.5} elements trigger entirely different emergency medical responses. Elemental carbon shows a uniquely strong correlation with pre-hospital emergency needs like cardiac arrest and acute respiratory distress.

Macro Events

Quantifying the acute mortality and ER impact of Asian Dust Storms based on seasonal range.

Micro Exposures

Tracking long-term Volatile Organic Compounds (VOCs) in petrochemical zones to assess cancer risks in school children.

Nature-Based Solutions

Deploying Airbox micro-sensors to prove the health benefits of community 'green curtains' and urban greenery.

Climate anomalies actively rewrite the transmission rules for infectious diseases



The Core Insight

Large-scale climate signals like El Niño-Southern Oscillation (ENSO) and monsoon anomalies drastically alter disease transmission. High heat paired with water outages severely exacerbates gastrointestinal and skin diseases.

Global Research Footprint

- Nepal: Linking climate variables to childhood diarrhea.
- South Asia & Pacific Islands: Tracking Dengue and Dengue-like illness outbreaks.
- Taiwan: Airborne transmission tracing in micro-environments like kindergartens and live poultry markets.

Student Opportunity: Join the Belmont Forum (AWARD-APR) international initiative. Collaborate globally to build climate-disease research networks.

Diagnosing the environmental threat landscape

Risk Diagnostic Matrix

	Extreme Temperature	Air Pollution	Infectious Diseases
Primary Stressors	Biometeorological indices & IPCC projections	PM2.5/PM10 composition, VOCs, Dust Storms	ENSO, Monsoons, Extreme Heat & Water Outages
Vulnerable Targets	Elderly, CVD/Renal co-morbidities	Urban populations, school children	South Asia / Pacific Island communities
Health Outcomes	Mortality, ER visits, Mental health decline	Acute respiratory distress, Pre-hospital cardiac arrest	Dengue, Diarrhea, Airborne viruses

Translating scientific modeling into foresight and national climate services

The Goal

We build decision-ready Climate Services that shift society from reactive to proactive.



Cardiopulmonary Early Warning

Web-based prototype deployed for high-risk populations in Taiwan.

SoSAFE

Early warning system for Dengue-like illness built for the Solomon Islands.

Institutional Impact

Providing hard scientific evidence to the Ministry of Health and Welfare (MOHW), Ministry of Environment (MOENV), and Ministry of Labor (MOL).

Partnering with the National Health Research Institutes (NHRI) and driving Corporate Climate-Related Financial Disclosures (TCFD) for financial giants.

Engineering sustainable ecosystems from water quality to green chemistry



The Engineering Core

- Analyzing reservoir eutrophication and modeling river Biochemical Oxygen Demand (BOD) under climate change.
- Assessing the hidden occupational health risks of reclaimed water systems.

Driving the Net-Zero Transition

- Quantifying the health co-benefits and dioxin emission reductions of replacing coal with biomass energy.
- Promoting Green Chemistry education and safe chemical alternatives nationwide.
- Embedding UN Sustainable Development Goals (SDGs) and net-zero targets into University Social Responsibility (USR) and campus governance.

The unified environmental resilience framework



Master the tools required to shape global climate adaptation



Advanced Data Mastery

- Process 23-million-record national health datasets.
- Master environmental epidemiology and spatiotemporal analysis.
- Build predictive risk assessment models.



Global Perspective

- Gain direct exposure to international frameworks like the Belmont Forum.
- Conduct research spanning Taiwan, South Asia, and the Pacific Islands.



Immediate Real-World Impact

- Your research will not gather dust in a journal.
- Contribute to vital government adaptation policies (MOENV, MOHW).
- Develop ESG and TCFD analytical skills highly sought after by top-tier financial holdings.

We are looking for data-driven problem solvers



The Ideal Candidate

- ✓ Fascinated by the intersection of Public Health, Big Data, and Environmental Engineering.
- ✓ Passionate about actionable Climate Change mitigation and UN SDGs.
- ✓ Eager to write code, analyze trends, and build systems that protect vulnerable communities.

Whether your foundation is in engineering, data science, or public health—if you want to use data to save lives under a changing climate, there is a place for you here.

Turn massive datasets into life-saving action

Join Prof. Yu-Chun Wang's Research Task Force.

Department

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Chung Yuan Christian University

Focus Areas

Environmental Epidemiology, Climate
Services, Big Data Analytics

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