



China – Advancing Environmental Understanding of Infectious Disease Dynamics Through Data Science

Methods for optimizing the surveillance of infectious diseases in rapidly changing low- and middle-income environments

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Background: This project — part of a recently funded NIH R01 — aims to develop statistical and computational approaches for better designing surveillance systems for high-priority global infectious diseases. Graduate or undergraduate students contributing to this project will advance methods to characterize dynamics of key infections in China in the presence of epidemiological and environmental changes, and subject to diverse surveillance system designs.

Project Description: These studies are being carried out in collaboration with the Institute for Public Health Informatics at the China Centers for Disease Control and Prevention in Chengdu, Sichuan Province, PRC. The interns will be supervised by Dr. Changhong Yang, the director of the institute, as well as by Professor Remais and his scientific staff. Members of our team will be embedded in the Institute for Public Health Informatics at the China Centers for Disease Control and Prevention, where they will query and analyze high dimensional surveillance data streams on the dynamics of TB, malaria, dengue, schistosomiasis, Japanese encephalitis and leptospirosis. Graduate or undergraduate students contributing to this project will:

- investigate the informational value of diverse surveillance architectures for monitoring these infections in China

- acquire and analyze 'Big' surveillance data drawn from China's massive NIDR system in order to do so
- develop tools for the characterization and infectious disease surveillance networks using both epidemiological analysis and simulation science

Required Qualifications: Undergraduate training in quantitative science is desirable, such as mathematics, modeling and simulation, computer science, environmental science, dynamical systems, engineering, population biology, or infectious disease epidemiology, although successful group members in the Remais Lab also have had backgrounds in physics, biology, anthropology and medicine. Technical skillsets, such as statistical analysis, geospatial analysis/GIS, time-series, differential equations, programming in any language (we are known to use R, Python, Matlab, Ruby, Perl, C, etc.), environmental modeling, theoretical ecology, or remote sensing, would be additionally desirable; effective written and verbal communication are essential.