

## **Epidemiological, ecological and environmental approaches to understand and predict *Coccidioides* emergence in California**

Multiple postdoctoral fellows are sought in the research group of [Justin Remais](#) at the UC Berkeley School of Public Health, PI of a new NIH-funded study ([R01AI148336](#); 2020-2025) examining the emergence of coccidioidomycosis (cocci) in Southwestern states, which are currently experiencing among the highest incidence rates ever recorded. The research will fill critical gaps in our understanding of the environmental transmission of cocci, including the dust exposures that pose the highest risk of infection; the role of zoonotic hosts in sustaining *Coccidioides* spp. survival and growth in soil; how land use, drought, and wind influence pathogen dynamics in soil and air; and how variation in dust and pathogen exposure interact with sociodemographic risk factors.

Postdoctoral fellows will have the opportunity to contribute to a cluster of studies that integrate machine learning/predictive modeling of the spatiotemporal distribution of pathogens in soil and air; whole genome sequencing to discover how pathogens adapt to changes in their physical environment; metagenomic analysis to determine taxonomic and phylogenetic relationships of known and newly emerged *Coccidioides* strains; precise methods of dust and exposure estimation; and spatiotemporal analysis of population-level data to elucidate fundamental aspects of cocci epidemiology. These activities will support two core epidemiologic studies in California: a retrospective cohort study of over 65,000 cocci cases (2000-2018) to determine key environmental and demographic drivers of cocci transmission foci at a high spatial resolution; and a case-crossover study with prospective surveillance for incident cases to estimate the pathogen exposure-response relationship within key high-risk subgroups. A major goal is to inform the public health response to the current epidemic through the design of improved surveillance and environmental intervention.

The postdoc would join an exceptional team at Berkeley working on a collection of related studies examining the consequences of environmental change for the dynamics of infectious diseases with U.S. and international collaborators (UCOP [MRPI](#), 2017-2021; NIH-FIC [R01TW010286](#), 2015-20; NIH-NIAID [R01AI125842](#), 2017-2022). These include projects investigating the industrialization of agriculture in West Africa, drought in California, and climate change in Ecuador and China. The group conducts analytical and computational research to characterize the response of a range of diseases (e.g., helminthic infections; WNV; leptospirosis; enteric diseases) to these critical stimuli, and the postdoctoral scholar will work closely with collaborators on these projects who are leaders in their fields, including [Sanna Sokolow](#) and [Giulio DeLeo](#) at Stanford; [Jason Rohr](#) at Notre Dame; [Elizabeth Carlton](#) at University of Colorado; [Howard Chang](#), [Ben Lopman](#) and [Lance Waller](#) at Emory; [Ellen Eisen](#), [John Taylor](#) and [Alan Hubbard](#) at Berkeley; [Joe Eisenberg](#) at University of Michigan; and [Manoj Gambhir](#) at Monash.

Ideal applicants would have a PhD and a demonstrated record of scientific achievement in infectious disease epidemiology, molecular or theoretical ecology, disease dynamics, statistics, or similar quantitative biological fields, and should be proficient at programming, modeling and/or data analysis (e.g., R, Python, Matlab, or similar). Experience with Hadoop, AWS, Spark, tidyverse, cloud computing, spatio-temporal modeling, modeling dynamical systems, etc. would be especially valuable. Candidates with backgrounds in mathematics or applied mathematics, computer science, engineering, the quantitative environmental sciences, or physics are also encouraged to apply. A track record of research excellence and strong quantitative skills are essential.

Interested applicants should submit a curriculum vitae, a 1-2 page letter that describes the professional qualifications for the above-described activities, and contact information for three referees, to Justin Remais [jvr@berkeley.edu](mailto:jvr@berkeley.edu).