



AI for Earth Grantee Profile

UC Berkeley

Predicting climate-related human migration

Summary

Solomon Hsiang and his team at the University of California (UC) Berkeley are applying AI to see how changes in climate have affected human migrations across Africa in the past, with an eye to the future. By applying machine learning to aerial images, the team is reconstructing a chronicle of population density, urban extents, and land use across Africa over time—helping estimate migration risk across the continent in the future.

Predicting climate-related human migration in Africa

As climate change makes itself felt around the globe, the impact of rising sea levels, extreme weather events, and drought is likely to [induce mass migration of people](#). Who is at risk? How many could move? Where will they go? These questions are challenging for the scientific community to answer because there is a lack of information on the location of people over time, especially in poor regions where populations might be the least stable.

Solomon Hsiang, a Chancellor's Professor of Public Policy at UC Berkeley, has built his career around investigating the effects that climate change has upon society and the economy. In his graduate work, Hsiang helped break new ground with studies showing that climate change both increases conflict at all levels of society and also correlates to dramatic drops in productivity. Now, Hsiang and his team are developing the first historical high-resolution reconstruction of population densities across Africa.

Hsiang's team is digitizing 1.6 million aerial photographs from surveys of 18 African countries since 1943 to better understand climate risk.

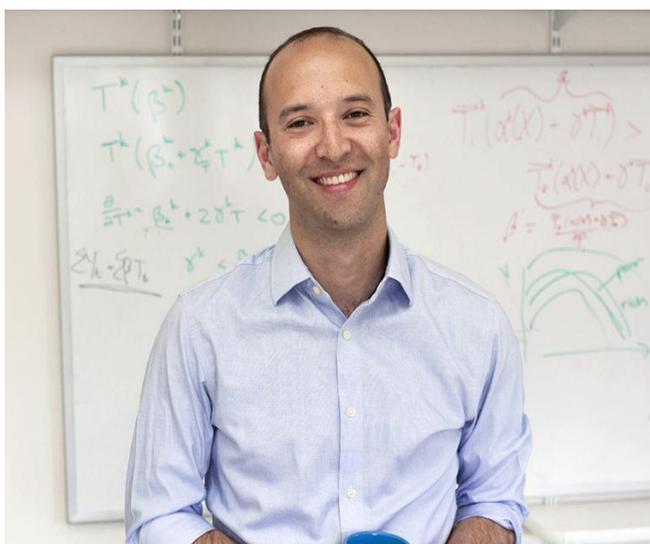
The team is digitizing 1.6 million aerial photographs from surveys of 18 African countries since 1943. By applying machine learning models to the scanned images, the team can reconstruct a chronicle of population density, urban extents, and land use across Africa over time. Then, using statistical tools and economic theory, they'll determine the effect of major droughts and climatic changes on historical migrations. Finally, they will

combine these results with climate model projections to estimate migration risk across Africa under multiple climate change scenarios.

By understanding who's at risk, where, and why, we can prevent or reduce the impacts of climate change. Governments can make investments today in water infrastructure or helping people find other ways to adapt to the changes so they don't have to move. Or by knowing where and how things are likely to change, people can better plan their moves, finding the best opportunities—and local governments can better prepare to welcome the newcomers. Just as we're all contributing to climate change, with better prediction tools we can all work together to live in a changing world.

About Solomon Hsiang

Solomon Hsiang is the Chancellor's Professor of Public Policy at UC Berkeley, where he founded and directs the Global Policy Laboratory. The lab uses data science and mathematical models to answer fundamental questions regarding climate change, economic development, war and violence, global health, natural disasters, human migration, food security, black markets, and ecosystem management.



Professor Solomon Hsiang. [Photo courtesy of Solomon Hsiang]

His recent work uncovered the influence of global temperature on global economic growth, underpinnings of gang violence in Mexico, the effect of legal ivory sales on global elephant poaching, and unintended consequences of geoengineering to counteract climate change. Hsiang received BS degrees from MIT in earth, atmospheric, and planetary science and in urban studies and regional planning; he received a PhD in sustainable development from Columbia and completed postdoctoral work at Princeton.

Currently on sabbatical, Hsiang is the Noosheen Hashemi Visiting Scholar at Stanford University's Center on Global Poverty and Development.

Resources

Websites

[AI for Earth](#)

Press

Marianne Phillips. "[Microsoft and National Geographic Society announce AI for Earth Innovation grantees.](#)" Microsoft on the Issues blog. December 11, 2018.