Social Connectedness Fellowship Program

Partnership Proposal

SAMUEL CENTRE
FOR SOCIAL
CONNECTEDNESS

Partnership Proposal

Partner Organization: Data-Driven EnviroLab (Data-Driven Lab), an interdisciplinary research group that seeks to create solutions to environmental challenges using cutting edge data analytics. We are based at the University of North Carolina-Chapel Hill, but work with partners around the world.

Location of Fellow: The Fellow could work remotely or if they prefer, we could also host them in Chapel Hill, NC.

Description of Proposed Project:

Are you interested in exploring urban sustainability at the intersection of social inclusion and climate action?

The Urban Environment and Social Inclusion Index (UESI) is a research effort that aims to provide the data that urban residents, city managers, and policymakers need to understand their cities' performance on critical urban environmental issues. Incorporating novel geospatial approaches, including remotely-sensed data and open source datasets (such as OpenStreetMap), the Index spatially maps environmental performance in over 160 cities, and reveals how these cities perform on sustainable inclusive urban growth.

The framework focuses on quantifying progress on the environmental dimensions of the United Nations Sustainable Development Goal 11, which aims to make cities inclusive, safe, resilient, and sustainable. It captures the spatial and socio-economic distribution of air pollution, urban heat island effects, urban tree cover, and public transportation access, amongst other environmental measures. This research aims to demonstrate the potential for innovative datasets to provide near real-time assessment of environmental

performance in a replicable and scalable manner. Furthermore, the UESI highlights knowledge gaps and identifies research priorities that could help cities build an evidence-based approach to enhance the equity of urban environmental performance.

We will work to add more cities to the Index; to add several more indicators to the Index; to provide a more in-depth profile of these cities; and to feature more case studies and multimedia content that ground the Index in concrete examples, with a particular emphasis on the synergies and interactions between social inclusion and urban environmental performance.

This year, DDL is seeking a SCSC Fellow to work on one of two projects:

1) High-resolution mapping of urban heat islands with citizen science data: in the summer of 2021, we partnered with local organizations in North Carolina, including the NC Museum of Life and Science and the Town of Chapel Hill, to organize citizen-science heat mapping campaigns. We then used these data to develop high-resolution maps of heat exposure to better understand which neighborhoods and populations might be the most vulnerable to future heat waves and extreme heat. The fellow would work with us to further expand this work, including the further development of the Cozie smartphone app, which collects semantic feedback information on urban heat, or develop/refine machine learning models for mapping heat stress.
2) Air pollution-islands: rural-urban air pollution gradients. More than 95 percent of the global population breathes unsafe air, primarily in urban areas. Existing satellite remote sensing data has contributed breakthrough advances in providing global estimates of air pollution exposure, although the spatial resolution is still inadequate to distinguishing intra-urban variability. Our previous SCSC Fellow worked with us to scope the possibility for quantifying an “air pollution island effect” as a way to assess rural-urban differences in air pollution. The

Fellow would work with DDL's data science team to further this methodology and implement preliminary analyses for the UESI cities.

While not required, candidates who have a background in data science computer science and are interested in practical programming experience can assist with a range of tasks, from big data mining to development of front-end data visualizations and graphics. In the past, we've had programmers help build databases, scrape public data sources, and develop machine learning models. The Fellow would share their experiences and insights, and if applicable, any analyses and visualizations on the UESI blog and/or in case study boxes featured as part of the report. To focus on these types of projects, experience with statistical programming language – particularly R or python – is strongly preferred.

Previous projects from DDL Fellows have included explorations of the Urban Heat Island effect in Montreal, Inclusive Air Monitoring strategies for Urban Areas, and the role of Public Transit systems in inclusive cities.

Key Deliverables:

1. A 25-30 page report, which can include research elements such as data collections and analysis.
2. One (or more) blog articles, ideally with multimedia or data visualization components. [Typically blog articles are 500-1000 words].
3. A more quantitatively-inclined Fellow can contribute to data analysis, web programming and visualization.

Key Skills/Competencies Required:

- Background in environmental studies, statistics, computer science or a related field

- Strong qualitative (and preferably quantitative) research and writing skills
- Able to work independently and with remote team members
- Excellent time management skills
- Experience with statistical programming language – particularly R - is an asset

Goals:

This research will help deepen the work on our Urban Environment and Social Inclusion Index that would likely not happen without the support of an SCSC Fellow.

Contact Details:

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