



The Belonging Forum

2026 Samuel Fellows in Belonging Program

Partner Organization:

Data-Driven EnviroLab,

University of North Carolina at Chapel Hill



Project Title:

Measuring Urban Environmental Performance and
Social Inclusion

2026 Samuel Fellows in Belonging Program: Project Proposal

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The Data-Driven EnviroLab (DDL) is an interdisciplinary and international group of researchers, scientists, programmers, and visual designers. The DDL uses innovative data analytics to distill signals from large-scale and unconventional datasets and develop policy solutions to contemporary environmental problems. Working with scholars and policymakers across the globe, DDL strives to strengthen environmental policy at all levels. We promote evidence-based approaches to problem-solving while boosting information disclosure and transparency among public institutions, private companies, civic organizations, and individual citizens.

The DDL is based at the University of North Carolina Chapel Hill and is based at the Institute for the Environment at UNC. As an academic research lab headed by Angel Hsu, Associate Professor at UNC-Chapel Hill, we have a particular mission to help train data-minded scholars and leaders in the field of environmental policy. Our group is primarily comprised of student researchers at the undergraduate and graduate levels.

The DDL is currently advancing a portfolio of projects that (1) assess the role of cities in global climate and environmental change and the policies that shape urban outcomes; (2) track climate commitments, especially net-zero targets, made by non-state and subnational actors; (3) apply emerging digital tools, including remote sensing, artificial intelligence, and machine learning, to improve the measurement and monitoring of greenhouse gas emissions; (4) examine urban heat and its disproportionate impacts on low-income and minority communities; and (5) expand the Urban Environment and Social Inclusion Index (UESI), which benchmarks progress across 300 cities worldwide using a set of environmental and social indicators.

Learn more at: datadrivenlab.org

Location of the Project: Chapel Hill, North Carolina, US

We would strongly prefer someone who could work locally with us in our Chapel Hill office. If not possible, we would strongly prefer someone who is in a US-based time zone. If the Fellow were to work with us in Chapel Hill, we could provide access to an office space, a monitor, desktop computer, and other supplies as needed.

PROJECT INFORMATION

Section 1: Description of the Project

Are you interested in exploring urban sustainability at the intersection of social inclusion and sustainability 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 city's performance on critical issues at the intersection of social inclusion and the environment. Incorporating novel geospatial approaches, including remotely sensed data and open-source datasets (such as OpenStreetMap), the Index spatially maps environmental performance in nearly 300 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

Section 2: Goals of the Project

In 2026, we plan to deepen various aspects of the UESI where a Fellow can directly contribute to its development or add contextualization through in-depth case studies. Key priorities for this year include working on expanding some of the new features of the UESI before its launch at the end of the year, with a particular focus on our updated heat-risk framework:

The Fellow can work on any of the following projects:

- **Project 1: Conceptual Framework – Social Connectedness Measure**

This project would focus on identifying and operationalizing relevant social connection/isolation indicators that can be incorporated into our extreme heat risk and resilience framework. Specific work would involve a targeted review of relevant literature (e.g., urban sociology, public health, disaster risk and prevention) to clarify the mechanisms linking social isolation to heat vulnerability and to assess which measures could be credibly and consistently measured across cities. The fellow would select one or more candidate indicators and design an approach that supports both cross-city comparability, and where data permits, within-city variation (e.g., neighborhood-level patterns). The fellow would conduct a small comparative case study of several cities, chosen in collaboration with our team, and compile data to measure the social inclusion indicator. The final product could involve a box or feature in the UESI index and website, or a publication intended for a peer reviewed publication.

- **Project 2: Exploring the Role of Bus Stop Design in Air Temperatures**

This project would involve using Kestrel low-cost air temperature and humidity sensors to measure air temperature under different types of bus stop shelters over the course of the summer. Sensors would be deployed at each site on a rotating schedule (or multiple simultaneous placements if available) to capture air temperature at rider height, and, where feasible, complementary variables like relative humidity and heat index. The analysis would compare thermal conditions across shelter types and contexts, focusing on metrics that are decision-relevant for transit planning (e.g., average mid-day temperature differences, frequency of “high heat” periods, and whether certain shelter features

consistently reduce peak heat exposure. The final deliverable would be a short write-up and briefing summarizing methods, results, and practical implications, with actionable recommendations for bus stop siting and shelter design (e.g., shade placement, materials, ventilation, and priority locations for upgrades). The project would involve fieldwork as well as an analysis/write up of the results and give some recommendations or implications for public transit design. Local partners could include the town of Chapel Hill, UNC Transit, UNC Chapel Hill as well as other partners, as the information would likely be useful to them.

- **Project 3: Assessing the Heat Mitigation Impact of Milwaukie Forests in Raleigh**

This project assesses the heat mitigation potential of a Milwaukie forest, a densely planted urban forest, in the Raleigh area. Using low-cost air temperature and relative humidity sensors (Kestrel Drop D2s), the fellow will quantify heat stress conditions within the forest and in nearby non-forested areas. By comparing temperature, humidity, and derived heat stress metrics across forested and non-forested sites, the project aims to examine the cooling effects of dense urban tree cover. Results will provide evidence of the role that compact urban forests play in reducing heat exposure and improving thermal comfort in urban areas.

- **Project 4: Assessing the Effects of Cooling Pavements**

In urban areas, man-made materials like asphalt in roadways contribute to the urban heat island (UHI) effect and variation in temperatures within urban areas. Cool pavements are a heat mitigation strategy that aims to lower temperatures by increasing the reflectivity of paved surfaces so that they absorb and re-radiate less heat. In this project, the fellow would assist in evaluating the impacts of a cool pavement program implemented by a local government in North Carolina. The fellow would support field data collection using a network of local temperature sensors installed throughout the city, engage with city officials, and conduct analyses to estimate program impacts.

Section 3: Guiding Questions

Project 1: Conceptual Framework – Social Connectedness Measure

- How to define social connectedness from an empirical perspective?
- What are the aspects of social connectedness to be considered?
- How can we measure social connectedness at the community and city level?
- How are these components related to urban-heat risk?
- How does this relation manifest in the selected cities?

Project 2: Exploring the Role of Bus Stop Design in Air Temperatures

- What are the differences in experienced air temperatures for people using public transit in Chapel Hill?
- What is the role of the bus station configuration and its surroundings in relation to heat?
- What proposed modifications to the bus station could be useful in mitigating the heat exposure to its users?

Project 3: Assessing the Heat Mitigation Impact of Milwaukie Forests in Raleigh

- What are the local climate conditions of the Milwaukie forest in Raleigh and its surroundings?
- What is the effect on temperature and humidity of the presence of the forest in surrounding areas under different conditions?

Project 4: Assessing the Effects of Cooling Pavements

- What are the physical effects (i.e albedo or reflectivity changes) of the cool pavement program in the treated streets?
- What are the effects of the cool pavement program implementation on near-surface air temperature?

Section 4: Research Methods & Dissemination Approach

Within the Samuel Fellows in Belonging Program, we propose three research streams:

- **Creative**
- **Advocacy**
- **Academic**

The tracks are designed to articulate the possibilities of diverse scholarship on belonging. The program recognizes that creative methods, advocacy-focused research, and academic research are all scholarly. All three tracks have the potential to address similar topics. We encourage Fellows and Partners to explore different ways of asking questions and sharing knowledge that instills belonging for the researcher and participants.

The main research approach at DDL is quantitative and thus the methods are rooted in that methodological framework. In that sense, common information gathering includes systematic reviews, field data collection through sensors and remote sensing, and statistical analysis for inferential results. However, while DDL holds a particular expertise in these areas, we encourage the fellow to potentially explore other methods and outputs which might be qualitative or creative in nature. Previous Fellows have found ways to translate the quantitative data into more creative outputs such as video-reports and photography collections.

Section 5: Key Deliverables

- **Work plan:** A co-created, phased work plan outlining research activities, community engagement, and dissemination of milestones.
- **1 blog post (500 – 1,000 word):** related to the project the Fellows are working on, posted to the Belonging Forum's website.
- **Final Output:** Primarily a research report: 20–35–page research report supported by primary or secondary source data.
- This is a mandatory output of the academic stream, however, Fellows are welcome to adopt creative methodologies or produce alternative outputs that encompass components of the other streams.
- **A Final Presentation:** A presentation to the Samuel Fellows cohort to share findings, community perspectives, and actionable recommendations.

APPLICANT INFORMATION

[About the Program/What the Program Offers](#)

The Samuel Fellows in Belonging Program empowers young people, recent graduates, and people with lived experience to engage in meaningful research and community action. At the Belonging Forum, our mission is to build connectedness within and between communities through partnerships, research, programming, learning initiatives, and advocacy. At the Belonging Forum, fostering belonging is central to our work. The Belonging Forum approaches the definition of belonging as connection to **the 4 Ps: people, place, power, and purpose**.

This is to say that belonging comes through our **relationships** with other people as well as through our **rootedness in nature**, our **ability to influence** social, political and economic decision-making, and our **capacity to find shared meaning and purpose** in our lives. The program offers a unique opportunity to apply the lens of belonging to issues that matter, to think intersectionally and holistically about the problems of the 21st century – while working alongside experts and community leaders.

This is a paid opportunity from June 2026 – February 2027. Fellows will carry out the research part-time on a schedule agreed between the Fellow, the partner, and the Belonging Forum. The Fellow will receive a bursary to support their work.

The Program offers:

- A flexible, part-time research opportunity.
- A bursary to support your research calculated based on cost of living where the Fellow is based and number of hours committed.
- Work with national and international community partners.
- Capacity building, skills development, and mentorship.
- Network and team building opportunities.
- All works produced by the Fellows are published on the Belonging Forum website and promoted on our social media channels.

[Equity Statement](#)

We encourage all equity-seeking groups such as immigrants, Black and Indigenous communities, people of color, women, young people, 2SLGBTQ+

community members, and people with disabilities to apply. Please let us know if you need any accommodation throughout the application and interview process and we will be happy to support you.

Thank you for your interest in the Samuel Fellows in Belonging Program. We thank all applicants for their interest, but only those selected for an interview will be contacted.

Key Attributes and Skills in the Applicant

- Background in urban studies, environmental studies, remote sensing, GIS, 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 (R or Python) – particularly R – is an asset.

While not required, candidates who have a background in data science and computer science and are interested in practical programming experience can assist with a range of tasks, from big data mining to the 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. To focus on these types of projects, experience with statistical programming languages – particularly R or python – is strongly preferred. 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.