

## **Data-driven Visualization of Climate Change in the Brazilian Amazonian: Revealing the impact of Amazonian agrarian systems on environmental and epidemiological changes.**

Scientific data on agricultural practices in the Amazon, such as large-scale crop cultivation, extensive livestock farming, and intensive agriculture, appear to be significant contributors to global climate change because they correlate with deforestation, habitat loss, and other environmental degradation. However, understanding the exact impact of these activities has been hampered by fragmented data. The launch of the Trajetórias dataset in 2023, as published in Nature, marks a pivotal moment in the field. This dataset provides comprehensive environmental, epidemiological, and social indicators for the Brazilian legal Amazon, providing researchers with a valuable resource for exploring the linkages between agricultural systems and their impacts.

The collaborative research project, led by Dr. Juan Salamanca of the University of Illinois at Urbana-Champaign and Dr. Tobias Mulling of the Federal University of Pelotas, State of Rio Grande do Sul, Brazil, aims to harness the power of data-driven visualization to explore the complex relationships among agricultural systems, environmental change, and epidemiological shifts in the Brazilian Amazon, particularly in the context of climate change.

The primary objective is to develop a data-driven visualization tool that integrates the Trajetórias dataset and facilitates a deeper understanding of the environmental and epidemiological consequences of Amazonian agricultural practices. By visualizing relationships between various indices, such as deforestation rates, burned areas, pasture coverage, and vector-borne disease incidence, the tool aims to provide valuable insights for policymakers, researchers, and the public. Using a visual analytics methodology, the project aims to create a user-friendly platform that enables stakeholders to understand the current state of the Amazon and inform policy decisions aimed at mitigating climate change in Brazil.

To achieve these goals, the project methodology emphasizes the importance of the Trajetórias dataset as a rich source of information and proposes the extension of an interactive visualization tool prototyped by Dr. Salamanca that allows users to explore relationships between different variables and dimensions. The canvas of the visualization tool is a multidimensional spatial structure that allows operations such as overlapping, scaling, transposing, and zooming on data points or clusters of them, revealing associations between data points or clusters.

The year-long collaboration between the School of Art and Design at Illinois and the Design Department of the Universidade Federal de Pelotas, State of Rio Grande do Sul, includes research visits and collaborative activities. These visits will include meetings, workshops, and collaborative work sessions designed to advance the goals of the project and foster cross-cultural exchange between the collaborating institutions. Potential benefits and outcomes of this research project include increasing public awareness and discourse on climate change in the Amazon, providing evidence-based support for policymaking not only in the Brazilian Amazon, but in the entire Amazon basin. In addition, the project aims to contribute to the generation of knowledge in the field of data visualization and digital design, paving the way for future research and innovation.