

Project Title Directories to geoData: Developing a Sanborn-Based Address Locator for Historical GIS

Project Summary Are you interested in recovering Houston's history? Fellows will reconstruct the evolution of Houston's turn-of-the-century social landscape by creating a process to construct a historical geolocator from georeferenced Sanborn maps. You will bridge historical geography and GIS technology, creating a tool to transform historical sources into precisely mapped spatial data.

Project Description Historical city directories are rich sources of information that locate populations spatially by listing names, professions, and residential addresses. However, this data often remains "trapped" in print or unstructured text, limiting researchers to small, manual samples. To move beyond searchable PDFs toward "deep mapping" and sophisticated spatial analysis of the contents of city directories, researchers require a functional historical geolocator that can translate nineteenth- and early twentieth-century address formats into modern coordinates.

This project aims to reconstruct Houston's historical road network by developing an address geolocator using already georeferenced Sanborn Fire Insurance Maps. Unlike general road layers, Sanborn maps are uniquely valuable because they contain actual historical addresses and have often already undergone the labor-intensive process of georeferencing. The fellows will leverage these maps and investigate how to use them to create a specialized geolocator in ArcGIS Pro and use it to georeference addresses in at least 4 Houston city directories, spanning 1870 to 1907, based on Sanborn maps from the 1885, 1901, and 1907 editions. Ultimately, the fellows will be co-authors of a public code repository enabling future researchers to create geolocators from other Sanborn maps as well as on a published research report describing the process of creating the geolocator in a journal like *Journal of Map & Geography Libraries*.

The project workflow involves using Google Vision AI to identify historical street names and numbers on the Sanborn Maps and investigating how to translate the location of text from the map to its georeferenced spatial coordinates. Students will then use ArcGIS Pro to build a geolocator that accounts for historical address ranges per block—identifying where numerical sequences stop and start and accounting for odd/even numbering conventions. This infrastructure allows for the interpolation of addresses that are not explicitly listed in relation to a landmark, providing a much higher degree of spatial accuracy than modern street-name-only datasets.

Key Tasks

- Verify historical street names and cross-reference directory descriptions with 366 georeferenced Sanborn maps from the 1885, 1901, and 1907 editions.
- Reconstruct the historical road network in ArcGIS Pro by altering modern GIS data to reflect the early twentieth-century grid and its change over time.
- Use Google Vision AI to locate street names and numbers in the map and translate them into spatial datapoints using transformations from the georeferenced maps.

- Update street GIS features based on the located names.
- Create historical geolocators in ArcGIS Pro, including defining address ranges, establishing odd/even numbering logic, and deriving exact property numbering from the Sanborn maps.
- Geocode entries from 4 historical city directories and generate heat map comparisons of addresses in the directories for validation and as an overview of the data.
- Contribute to publishing a research report describing the process developed to build the geocator in a journal like Journal of Map & Geography Libraries.

Anticipated Project Outcomes The primary outcome is a functional historical address locator and a reconstructed road network for a significant portion of Houston’s history as well as published code and a research report (to be finished by the mentors after the fellowship period). The impact will be three-fold: it provides a tool for Rice researchers to conduct large-scale longitudinal studies; it preserves historical spatial data in a sustainable digital format; and it democratizes access to urban history for the public.

Qualifications

- Strong interest in historical preservation.
- Foundational knowledge of programming, preferably Python, and/or GIS software.
- Attention to detail and the ability to work independently on complex spatial problems.

Learning Outcomes

- Advanced spatial data literacy.
- Practical use of Google Cloud AI tools.
- Technical mechanics of building geocoders.
- Digital humanities methodology of “deep mapping”.
- Experience in the ethical considerations of geocoding historical populations and with academic publishing.