Proposal SIP workshop 24–28 March 2025, Flagey

Explorations on Indigenous Urban Land-Use Patterns around Merida, Yucatan

Fig. 1: vectorising the georeferenced first surviving town plan of Merida 1864-5 in QGIS

Content/scope

The search for an evidence-base that can guide and inspire regionally appropriate sustainable urban planning and design using an integrative perspective on indigenous urban landscapes in the long-term has resulted in a diverse collection of historical spatial data. Georeferencing, layering, and mapping changes in urban morphology and basic land-use categories in GIS facilitates future comparative spatial analytical research on the material elements and form characteristics of urban adaptation, densification, and landscape transformation.

During the SIP, we propose to explore the dry tropical region around Merida, Yucatan, which has been a centre of urban life for around 2500 years. Several major Precolumbian Maya cities developed in the vicinity of what is currently the large cosmopolitan and rapidly expanding city of Merida. Aspects of indigenous urban practices and patterns can be traced from the archaeological evidence on these cities to remnants in urban and architectural vernaculars surviving today. The major (residential) expansions realised in and around the city and the wider region produces demonstrably unsustainable and largely undesirable urban land cover. Indigenous knowledge and principles play no discernible role in these expansions, while adapted vernacular urban patterns are affected and disappearing under developmental pressure. Recognition of and enhancing the accessibility of evidence on indigenous urban form throughout urban history, is considered an important first step towards enabling regionally appropriate sustainable urban planning strategies and design proposals.

The proposed programme is based on participation in ongoing research tasks, contextualised by reflections on the value of indigenous urban heritage and cultural resilience for conceptualising socio-ecologically viable urban development specified by the cultural history of the region. Under the guidance of Benjamin Vis, students will work on a variety of spatial data on land use, land cover, vernacular architecture, and impactful recent changes in the urban landscape, mainly realised within QGIS. The range of research tasks that students can contribute to below, reflect research actions started by Benjamin Vis but as yet insufficiently advanced and prepared to become effective in analyses and data visualisations or to be presented as a data resource. Participants will be given the opportunity to learn about and engage in a variety of mapping methods and to pursue their own interests within the scope of this research. Students will be encouraged to consider on how the specificities of this region and a deeply historical approach to urbanism relate to their knowledge, experience, and interests.

Fig. 2: badly preserved remnants of traditional vernacular architecture in residential plot, Caucel (Merida, Yuc.)

Fig. 3: overlapping and connecting samples of photographed historical cartography, layered in QGIS

Range of research tasks:

1. ***Historical cartography of Merida and surrounding region***
   - Graphic enhancement to improve and homogenise the visual clarity and readability of photography of historical (manuscript) maps from large land holdings (such as haciendas) since converted into urban neighbourhoods, using Gimp, Photoshop, or similar.
   - Checking and standardising the basic documentation of map metadata and transcribing toponyms or related geographical information.
   - Geolocating main places and/or toponyms on the maps, followed by the georeferencing in QGIS of these maps (if feasible).
   - Explore georeferenced examples of maps in QGIS to identify, annotate, and categorise key morphological traces in present-day data on the city of Merida.

2. ***Urban morphological change mapping***
   - Mapping and dating recent micromorphological changes in QGIS from free time-lapse Google data (Streetview & Google Earth) along urban transects walked during fieldwork, annotating e.g. new and changing plots and plot boundaries and construction activities, as well as identifying remnant examples of traditional historical vernacular architecture and its loss.
   - Identifying, characterising, and visualising urban change (plot structure, architecture, positions and relations, dimensions, vegetation cover, etc.) between 'time slices' of urban blocks, which were 'reconstructively' vector mapped through time in QGIS.
   - Evaluating the usability of Copernicus Global Human Settlement Layer, Google Open Buildings, and other (free) GIS data resources for the assessment of green space loss across urban morphologically distinct contexts in the region.

3. GIS vector mapping: creating and editing spatial analytical data

- Contributing to a 'digital GIS edition' of the first historical town plan of Merida from 1864-5: vectorising and classifying land cover/land-use units to produce an analytical geospatial representation.
- Extending the sample set of diachronically mapped urban blocks through reconstructive vector mapping according to rudimentary land-use categories from georeferenced historical aerial photography.
- Preparing sample areas of residential areas by reconstructively remapping archaeological urban topographic GIS data.
- Option of trialling the Boundary Line Type (BLT) Mapping workflow or considering how boundary mapping might be adapted to better suit the socio-ecological value of the land cover data collected in the region.

4. Work on vernacular architecture and urban design

- Documentation of residential open space use, plot boundaries, and contemporary (self-built) urban vernaculars: extracting, processing, and digitally formatting (spreadsheets, database) observational fieldwork data recorded on paper sheets and organising the associated photographic survey.
- Digitally formatting and transcribing forms filled during extensive explorative interviews on urban open and green space usage, perception, and value to residents (Spanish language skills required).
- Establishing the topological and morphological parameters for architectural plot-building set typologies in samples of archaeological, historical, and contemporary GIS mapping data.

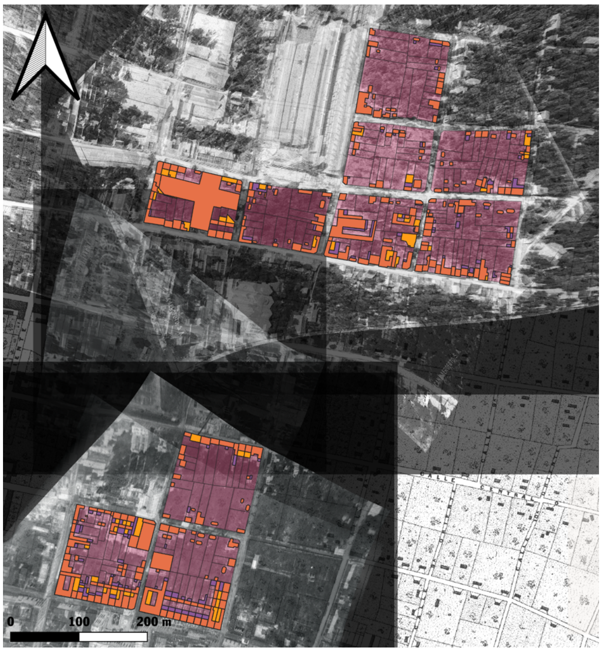

Fig. 4: reconstructive vector mapping of urban blocks from georeferenced historical aerial photography (1930s)

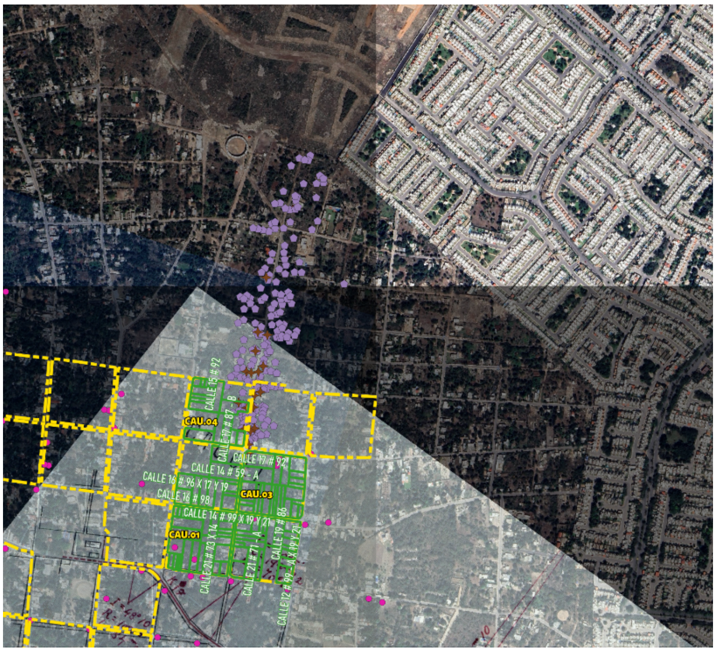

Fig. 5: micromorphological change mapping in QGIS in traditional Caucel's periphery cut-off by new development

Outline programme

Monday

- Introductory lecture by Benjamin N. Vis on the concepts and objectives informing his long-term urban morphological approach to evaluating the urbanising region of Merida, Yucatan and the evidence and research challenges encountered
- Initial review of ULB library resources on Maya urbanism, early colonial towns in Mexico, Maya vernacular architecture and cultivation practices, urban (planning) history in Yucatan, longitudinal micro level urban morphological analyses, urban morphological analysis in Mexico/Central America, and (lowland) tropical Mexican sustainable urban development
- Inventory of interests and orientation on the research tasks

Tuesday

- Lecture by Benjamin N. Vis on comparative urban morphology methods & developing 'Boundary Line Type Mapping' as a conceptual and analytical representation of social life in urban form
- Collaboration and guidance on research tasks
- Trouble shooting and evaluation on student skill development in practice

Wednesday

- Public lecture by Christian Isendahl (University of Gothenburg) or Elisabeth Graham (UCL) on the sustainable qualities of Maya agro-urban landscapes and the value of archaeological knowledge on indigenous and tropical urban traditions for addressing questions in urban life and development
- Collaboration and guidance on research tasks
- Support on technical skill development with Alexandre Brossard and Phillippe Lecocq

Thursday

- Focus on making progress in respective research tasks, supported by all instructors

Friday

- Evaluation of progress with short peer-to-peer presentations and proposals for final presentation and/or visualisation as part of the exhibit
- Finalising empirical tasks
- Preparing and producing the final exhibit

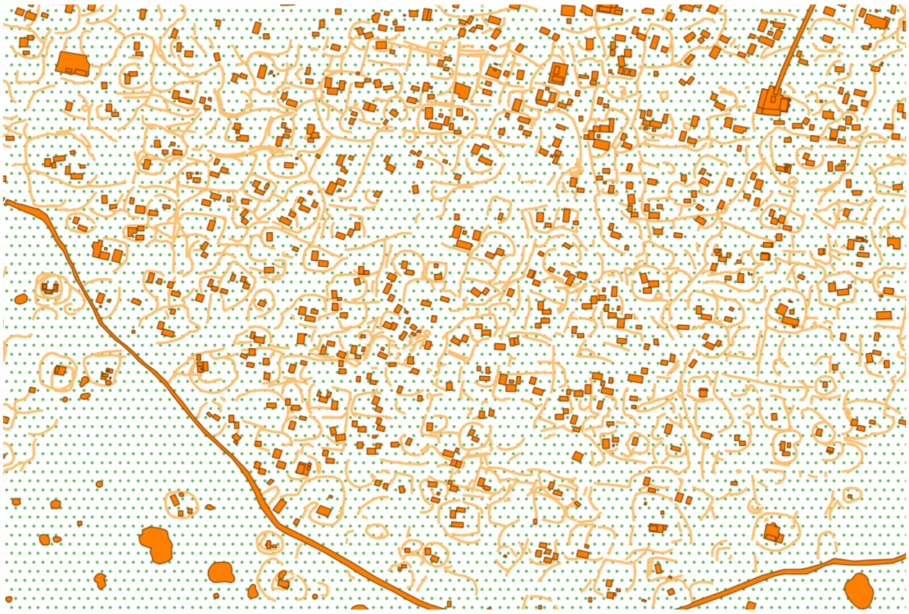

Fig. 6: sample of archaeological topographical map of Mayapan ~13-14th c.

Expected results

The practical activities will lead to the production of a small exhibit on the progress of preparing and processing these spatial data sources, and the insights derived from these empirical tasks on their potential for analysis, visualisation (mapping, drawing, modelling, etc.), and use in urban planning practice. The data produced will be taken forward in the research project of Benjamin N. Vis and may give rise to spin-off project ideas, thesis projects, and future collaborations on extensions or new case work.

Anticipated students

10 to 15 students

We think this SIP is especially suitable for students with an interest in urban and architectural vernaculars; the (tropical) global south; history, archaeology, and heritage; GIS and cartography; landscape-based approaches to urban planning; developing spatial data skills across disciplines; urban morphology; indigenous and subaltern populations. It is advisable to have enjoyed an introduction to GIS or some prior experience applying QGIS, as the programme does not foresee a basic instruction on QGIS. However, many tasks ultimately rely on editing and mapping skills which are comparable to AutoCAD drawing and other graphic editing software. Not all tasks (immediately) require GIS skills, therefore few motivated students without such skills can be considered. Spanish language skills can be an advantage, but are not a requirement. Freeware such as GIMP and QGIS *can be downloaded and installed on students personal laptops (docking onto larger screens and mouse optional).*

Instruction

Benjamin N. Vis
Victor Brunfaut
Philippe Lecocq
Alexandre Brossard
Guest lecturer: Christian Isendahl (University of Gothenburg) or Elisabeth Graham (UCL)

Bio sketch Benjamin N. Vis (Research Fellow)

Benjamin N. Vis is an MSCA Postdoctoral Fellow at ULB and Universidad Autónoma de Yucatan. Previous project developed an original urban morphological mapping method and explored the links between sustainable urban design and Maya urban landscapes in an international research network and multidisciplinary exhibition. His current transdisciplinary project seeks to harness the adaptive capacity of urban land-use practices revealed by the long-term trajectory of indigenous urbanism around Merida in north-western Yucatan to inspire appropriate sustainable urban planning and design. Working in Mexico over the past two years, he recognised the lack of historical evidence to build analytical connections between the precolonial archaeological past and the present. This meant the project started focusing on gathering comparative morphological data from historical cartographic and aerial photography sources. Now based at ULB, the project enters a new phase where the spatial data gathered in Mexico is prepared for urban morphological analyses and his explorative fieldwork carried out in traditional satellite towns that are heavily affected by expansive urban growth will be used to contextualise mapping evidence. Together with regional urban planning stakeholders he will work on establishing reimaginative indigenous urban development principles that promote sustainable and equitable urban form around the city of Merida.