DEBATES IN ARCHAEOLOGY SYMPOSIUM

# THE ARCHAEOLOGY OF ALTERNATE URBANISMS IN THE TROPICAL WORLD IN THE CONTEXT OF NEW TECHNOLOGIES AND METHODOLOGIES: LASERS, RADAR, AND AI

A HYBRID EVENT

**APRIL 21 - 22, 2023**

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University of Toronto

# LAND ACKNOWLEDGEMENT

The Archaeology Centre wishes to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

# THEME

Archaeologists have long doubted that tropical environments could sustain large-scale urban complexes or extended, intensive agricultural systems in pre-modern times. However, compelling evidence is emerging that complex social formations flourished in densely vegetated or re-engineered tropical ecosystems. Across the globe in tropical forest environments, archaeologists have identified the material correlates for early urbanism, domestication, intensive and extensive agriculture, and infrastructural development on a scale that rivals the urban landscapes of non-tropical regions.

In recent years, remote-sensing techniques, including lidar and ground penetrating radar, have revolutionized our understanding of preindustrial urbanization and imperial expansion in tropical and non-tropical environments (Canuto et al. 2018; Heckenberger et al. 2008; Klassen et al. 2021; Sarathi (ed) 2018; Ur 2010). New developments in artificial intelligence and novel approaches such as settlement scaling have also significantly advanced our analysis of these processes (Ortman et al. 2015).

The invited Keynote speaker and 5 panelists will debate whether preindustrial urbanism in tropical forest ecologies share unique structures, institutions, landscapes, and historical trajectories, and they will evaluate in turn how urban polities in the tropics compare with cities and hierarchical social formations that developed in other regions of the world. For instance, does low-density urbanism constitute a common feature of cities in tropical environments, and how can we explain alternate settlement systems and historical variations in the social and economic organization of green cities? As a corollary, what generalizations can be made about tropical urban landscapes in terms of neighborhood associations, urban planning, investments in infrastructures, and the integration of cities in larger political systems?

In addition, speakers will assess the contributions and limitations of new technologies in the study of tropical urbanism, including lidar and AI.In the end, the talks will present a variety of case studies of alternate urban political orders from tropical climates across the world.

## Citations

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# ABSTRACTS

DATA-DRIVEN METHODS FOR DEFINING URBAN SETTLEMENTS IN THE
MAYA LOWLANDS: COMPARING THE CASES OF CLASSIC MAYA TIKAL
AND LA CORONA

Marcello Canuto and Luke Auld-Thomas, *Tulane University*

The study of urbanism has intensely examined and compared the spatial scale,
population density, and internal organization of ancient communities around the
world. The potential benefits of this research endeavor are considerable, ranging
from identifying sustainable and unsustainable land use regimes to comprehending
the fundamental processes that led to (and continue to drive) urbanization. At the
core of all such evaluations, however, rests the fundamental challenge of
determining where a settlement ends. We contend that this seemingly pedestrian
methodological issue is an existential threat to research on tropical (and
particularly low-density) urbanism. On the one hand, since all spatial data is
subject to the Modifiable Areal Unit Problem, different ways of creating boundaries
have a profound impact on how we perceive spatial processes. Alternatively,
without distinct boundaries, how can researchers determine when a city transitions
into the surrounding countryside?

Using settlement data from the Maya Lowlands as case studies, we propose several
data-driven and generalizable approaches to identify the boundaries of human
settlements with minimal subjectivity. In addition, these approaches serve to further
study the composition of such settlements and to establish points of comparison
that reveal where and how settlements differ from one another. For this reason, we
suggest that much of what appears exceptional about sprawling, low-density
tropical cities in the archaeological literature results from how archaeologists
define these settlements, whereas data-driven approaches produce a picture of
more compact and crowded cities tightly integrated with agricultural hinterlands:
much like other cities, it turns out.

# RE-CENTERING TROPICAL URBANISM AND LIDAR IN CENTRAL AMERICA: THE CASE FOR EASTERN HONDURAS

Anna S. Cohen, *Utah State University*

The increasing application of airborne lidar and other remote technologies in parts of Central America has reconfigured conversations about urbanization and landscape engineering in the region and throughout the precontact Americas. While many of these discussions focus on the well-studied Maya region, this paper contends that Eastern Honduras should also be analyzed through the optics of tropical urbanism. This part of Honduras is sometimes viewed as the easternmost limit of Mesoamerica, the so-called cultural borderland or periphery of more extensive urbanized societies in zones of Maya influence; yet, emerging research shows that communities living in the region strategically borrowed from neighboring cultural traditions while creating their own architectural and material configurations. This presentation draws from over twenty years of remote sensing data from Eastern Honduras (Olancho, Colón, and Gracias a Dios) with over a thousand square kilometers of data, including legacy and recent airborne lidar and satellite imagery data, to explore ideas of urbanism and social cohesion in the region. We consider: Does the sometimes-disparate coverage and quality of datasets cause researchers to underestimate the degree of networked urbanization and intersections of populations and traditions? What is gained and what is lost by omitting Eastern Honduras from discussions of tropical urbanism in the Americas? By integrating multiple remote datasets for the first time, this presentation seeks to re-center discussions of tropical urbanism and lidar and other geospatial tools in Central America and to investigate how Eastern Honduras fits into a larger model of political influence in Mesoamerica and adjacent areas.

# XINGU GARDEN CITIES: AN ARCHAEOLOGY OF HOPE IN THE SOUTHERN AMAZON'S "ARC OF DEFORESTATION."

Michael Heckenberger, *University of Florida*

Research on the archaeology and indigenous history of the Amazon suggests that rather than tropical wilderness, as assumed in the scientific and popular imagination over the past few centuries, the region has a complex history of coupled human-natural systems, particularly over the past millennium. This suggests that human agency changed the face of Amazonian biodiversity, notably by large, settled late pre-Columbian regional societies. The Xingu in the southern transitional forests is an exemplary case of the highly complex domesticated landscapes and regional planning that existed across many parts of the region in the past. In the Xingu, dozens of dense clusters of towns and villages, all linked by well-planned networks of roads – described as "garden cities" – existed within a regional peer polity that extended over an area of roughly 50,000 km². This talk summarizes 30 years of collaborative cultural heritage mapping, place-based archaeology and spatial ethnography with descendant Indigenous communities aimed at uncovering the deep history and practical or spatial logic of these systems, which continue today. This alternative variety of preindustrial urbanism worked with nature not against it and understanding them will help promote sustainable land management in the future. Recent studies, including remote sensing, lidar and big data mining, have revealed similar systems across much of the southern Amazonian transitional forests, the so-called "arc of deforestation," which are considered here with respect to the ethical and practical issues of collaboration with descendant communities.

## LASERS, RADAR, AND AI AS INVESTIGATIVE TOOLS TO BETTER UNDERSTAND THE ARCHAEOLOGY OF URBANISM IN MEDIEVAL CAMBODIA

Sarah Klassen, *University of Toronto*

Like many areas of the tropical world that are now characterized by dense vegetation, compelling evidence using lasers, radar, and AI have revealed vast preindustrial settlement complexes that were once home to hundreds of thousands of people in Cambodia. In this talk, Klassen will overview the results from the Cambodian Archaeological Lidar Initiative and how the lidar scans have allowed archaeologists to identify past urban landscapes as well as design research programs to better understand their development, longevity, and ultimate vulnerabilities. While lidar has worked exceptionally well in urban areas characterized by floodplains, occupation areas are more difficult to identify in upland sites and, thus, researchers have begun pairing the lidar data with other remote sensing techniques, like ground penetrating radar to understand the structure of these ancient settlements better. The resulting maps have led researchers of Cambodian history to reconsider what may have comprised an ancient Angkorian city and how to define the limits between urban and rural. As well as draw comparisons between ancient Angkor and concepts, like settlement scaling, in contemporary cities.

# THE SOCIAL REACTOR PROCESS AND LOW-DENSITY URBANISM

Scott G. Ortman, *Department of Anthropology and Institute of Behavioral Science, University of Colorado*

For nearly a century, researchers have defined cities in terms of their size, density, and division of labor; and a range of models, from the isolated state to settlement scaling, have sought to account for these features. The identification of low-density urbanism, especially but not necessarily limited to agrarian societies in tropical environments, potentially represents a challenge to this longstanding research tradition. In this talk, I explore the significance of low-density urbanism for general urban theory. I first examine the degree to which low density urbanism is merely a definitional problem, finding that it is in fact a real phenomenon, but that much confusion arises from the different ways that investigators view variation in density within settlements, across settlements, and over time. Then, I argue that a key parameter that has been excluded from previous formulations—the frequency of social mixing—allows one to derive the features of low-density urbanism from the same basic social processes manifest in more 'typical' urban systems, thus providing a basis for integrating low-density urbanism into existing frameworks.

## BAOBABS, CAVES, AND TOWNS: AN ALTERNATIVE VIEW OF URBANISM IN PRE-COLONIAL ZANZIBAR

Akshay Sarathi, *Texas A&M*

Studies of urbanism in East Africa have tended to focus on the medieval "stone towns" that dot the coast. However, studying these more traditional expressions of urbanism produces an incomplete picture of the settlement patterns of precolonial East Africa. In islands such as Zanzibar, settlement patterns are unique due to the presence of limestone caverns with access to freshwater. These caverns, which number more than 500, have served as dwelling places for humans for millennia. Further, forager camps, fishing stations, and seasonally occupied locations cannot be ignored. I argue that the activities of town-dwellers, cave-dwellers, mobile foragers, fishers, and seasonal visitors intersected in creative ways that challenge traditional understandings of urbanism and force us to look beyond traditional settlements to a landscape of practice across which different human groups interacted in a variety of ways.

# MESOPOTAMIAN URBAN STRUCTURES IN COMPARATIVE PERSPECTIVE

Jason Ur, *Harvard University*

The study of Mesoamerican urbanism has evolved rapidly in recent decades, especially via the use of new remote sensing techniques. It has revealed distinctive forms of tropical preindustrial cities that are dramatically different from the "classic" early city form known from the ancient Near East and codified by scholars such as V. Gordon Childe. This presentation will review recent work on Mesopotamian cities that has uncovered previously unsuspected variability, including low density forms that bear similarities to forms we now associate with tropical ecologies.