



16 Summary of the Webinar Presentation

Tim Stonor

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Hosted by: Spatial Analysis and Simulation Lab/Community (SASL)

Title: **The Urban Cortex**

Introduction

The Spatial Analysis and Simulation Lab (SASL) recently hosted Professor Tim Stonor. The session drew participants from around the world to explore how spatial morphology—the study of urban forms and patterns—can be integrated into urban design to address pressing environmental and social challenges. Dr. Nabil Mohareb, Associate Professor and session host, highlighted SASL's commitment to combining cutting-edge spatial analysis with innovative approaches to urban planning.

Speaker Profile

Prof. Tim Stonor is an architect and urban planner specializing in the design of human behavior patterns—how people move, interact, and transact in buildings and urban spaces. He is a visiting professor at the Bartlett School of Architecture (UCL), serves on the Norman Foster Foundation advisory board, is a former deputy chair and trustee of the UK Design Council (now an ambassador), and is a founding member and former director of the Academy of Urbanism.

Presentation Insights: Theoretical Framework and Research Approach

Framing the “Urban Cortex.” Stonor invited the audience to consider cities as extensions of the human brain—an “urban cortex” capable of sophisticated computation when well designed. This framing places “meaning” at the center of spatial analysis: not only what we can model, but why we analyze, in order to shape a future that learns from the past and optimizes conditions for people.

Art + Science, people-first. Drawing on the origins of space syntax, Stonor emphasized architecture as both art and science, and foregrounded human behavior as the focus of analysis and design practice.



Practice–research loop. He described a long-running feedback loop between consulting practice and academic research: models inform design decisions, and observations and outcomes flow back to research.

Key Themes and Analysis Steps

1) Wayfinding fundamentals: simple vs. shortest routes

Through observation and measurement, Stonor highlighted that many people prefer simpler routes (with fewer angular changes) over strictly the shortest ones—an idea operationalized in space syntax by accounting for angular deviation, not just metric distance. Empirical mapping and behavior tracing show people “cut corners,” avoid blind ends, and gravitate toward lines of sight—insights that are then encoded in plans and counts.

2) Urban regularities and the historic grid

Across the world's cities, continuously connected street grids tend to exhibit a small number of long, highly active streets and many shorter residential streets; blocks are typically smaller and denser toward the city center than at the edges. These regularities underpin movement, land-use distribution, and urban experience.

3) From analysis to route hierarchy (a practical vocabulary)

Modeling blends metric and angular costs to find paths of least resistance across every origin–destination pair. Summarizing those results yields a route hierarchy (a client-friendly term aligned with network betweenness/choice), making it easier to communicate which streets channel more movement and why.

4) Design as modeling: from proposals to outcomes

Models run quickly to test how proposals “plug into” their broader context. A grid that doesn't connect will act like an enclave; re-stitching to existing lines raises route hierarchy and movement potential. Streets can then be re-dimensioned to favor walking and cycling.

Trafalgar Square Case: Space syntax guided the reconfiguration from edge-only pedestrian movement to a central connective “X” via new steps (replacing a historic wall), transforming flow and use of the square.

5) Topography and comfort layers

Models can incorporate slope (e.g., Monaco) as a compensatory factor; equally, thermal comfort matters—highly connected streets in full sun underperform relative to those in shaded areas.



Stonor showcased Middle Eastern examples that prioritize deep, multi-layered shade, while also noting the heat risk even in London.

6) Scale-up and integrated urban modeling

Work now spans city–regional scales (e.g., an Arabian Peninsula model), opening options like aerial mobility concepts where roads could damage heritage landscapes.

7) AI-assisted generation

Using agents and constraints (e.g., noise cones, water, trees), the team grew a primary/secondary grid, allocated uses along main streets, and laid out public transport—accelerating iterations while baking in lessons from historic urbanism (walkable main streets, taller corners, permeable blocks).

8) Beyond movement: cities as transaction machines

Stonor closed by reframing cities as crucibles of invention and innovation, where co-presence, communication, introduction, and exchange generate social and economic outcomes—the deeper meaning behind the urban “buzz.”

Interactive Session (Q&A): The interactive session featured several insightful questions from the audience:

Key discussion points included:

- **GPS, AI, and Future Navigation:** a question about how new technologies like GPS, which often use "shortest path" algorithms, might affect urban design and whether new theories of wayfinding are needed. **Stonor** responded that a key flaw in current GPS is the lack of "angularity" in its algorithms. He noted that while technology enables "transpatial" interaction, physical cities remain essential for high-quality social connection. He argued that the human brain has not undergone fundamental changes over millennia, providing a stable basis for interaction and understanding that transcends technological advancements.
- **Historical Patterns vs. Future Change:** A question about the validity of using historical patterns to design for a future with rapidly changing behaviors, such as the decline of high-street retail due to online shopping. **Stonor** clarified that while behaviors and technologies change, the underlying spatial structure of a city changes very slowly. He stated that the models are robustly proven to forecast human behavior patterns, noting that Oxford Street's fundamental spatial connectivity remains, even if its shops change. The models do not prescribe a specific design but provide robust insights into the likely functional impact of any proposal.



- **Encouraging Active Travel:** A question (via chat) was asked about methods for introducing better active travel proposals in later stages of development. **Stonor** explained that many clients, from mayors to developers, are already seeking to move away from 20th-century car dependency. His work provides the scientific analysis to support their instincts for change. He emphasized that a core mission is to disseminate these tools to make this new way of thinking standard practice.
- **Do we need new wayfinding theories?** While behaviors evolve, Stonor stressed that shared cognitive fundamentals produce consistent relative patterns (which streets are busier/quieter). Oxford Street remains London's busiest pedestrian street due to its spatial connectivity, even as retail trends shift. Models, validated across multiple cases, forecast the impacts of changes in connectivity or land use.

Key Takeaways

- **Meaning-led modeling:** Spatial analysis must serve human purpose—learning, interaction, and equitable access—not just technical optimization.
- **Simplicity matters:** People often choose simpler routes over the shortest ones; modeling must include both angular and metric distances.
- **Cities are not chaotic;** they possess an underlying spatial structure that powerfully influences human behavior.
- **The "Urban Cortex"** concept frames cities as extensions of the human brain, designed to facilitate interaction, transaction, and collective problem-solving.
- **Human wayfinding** is driven more by simplicity (less angular change) than by metric shortness, a principle that can be modeled to predict movement.
- **Spatial connectivity**, also known as "route hierarchy," is a robust predictor of movement flows, land-use patterns, and economic value.
- **Twentieth-century car-centric planning** was a flawed inversion of thousands of years of successful, walkable urbanism.
- **Data-driven analysis and generative AI** are critical tools for designing and testing more efficient, resilient, and human-centric cities.
- **The ultimate purpose of cities** is to function as "transaction machines" that foster the social, economic, and intellectual exchanges that create the "urban buzz."

Conclusion

"The Urban Cortex" reframes cities as cognitive, social machines. By measuring how space structures movement (and thus encounter) and by testing proposals rapidly—from steps on a square to city-scale grids—Stonor showed how combining human-centric meaning with computational modeling can steer design toward walkable, connected, and more resilient urban life. Mohareb thanked the speaker for a valuable and insightful presentation and discussion, concluding the session.



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