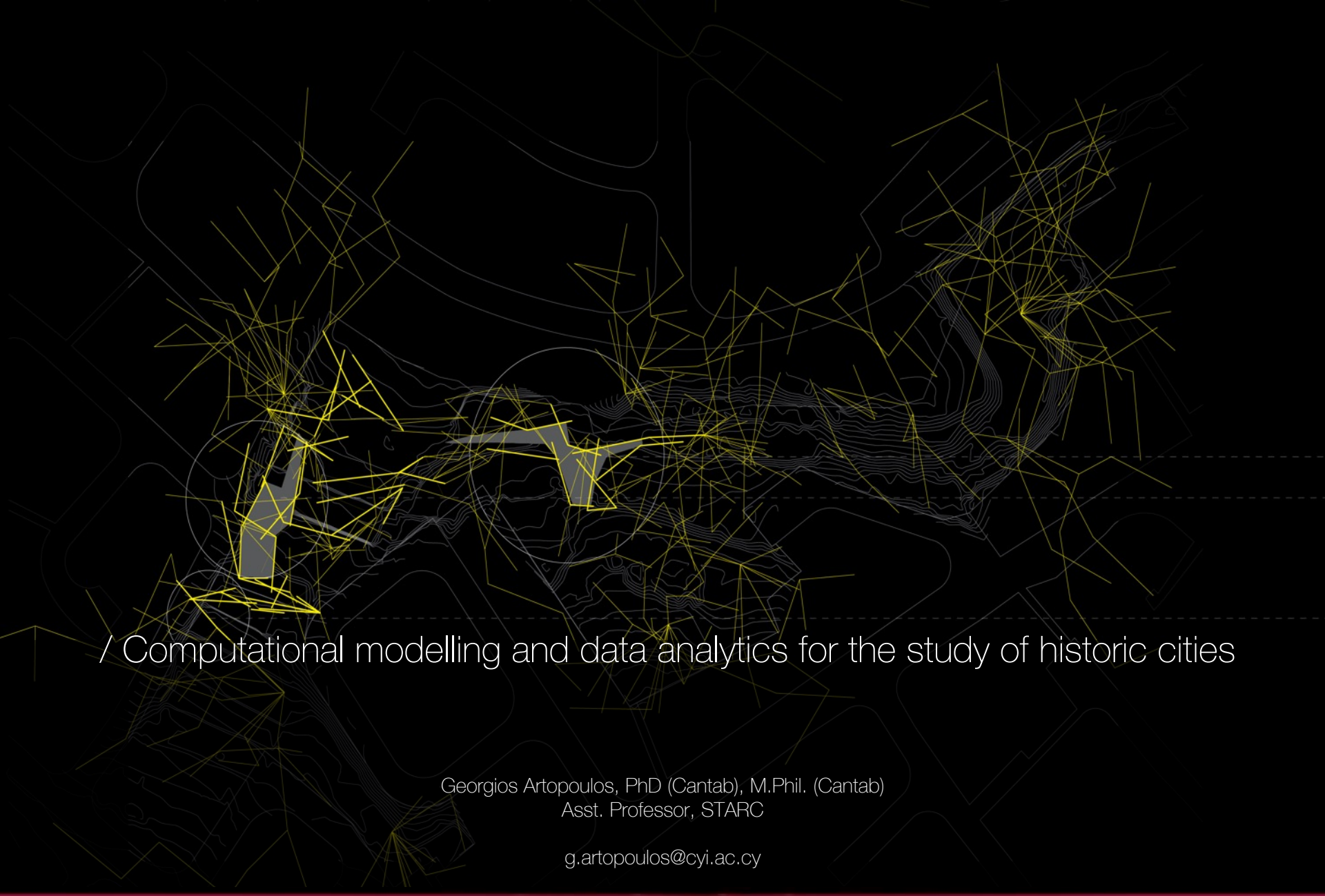


/ Computational modelling and data analytics for the study of historic cities

Georgios Artopoulos, PhD (Cantab), M.Phil. (Cantab)
Asst. Professor, STARC

g.artopoulos@cyi.ac.cy

STRUCTURE

/ Modelling and simulation in:

. Archaeological research

. Architecture research on contemporary (historic) urban spaces

/ Modelling and simulation for:

. visualisation & spatial reconstruction methods

. crowd simulation in virtual environments

. built environment research, with ABM

. design & planning, with computational & parametric tools

Modelling and Simulation

Reconstruction has always been an important process for research and an even more important way for scholars to engage with the past and future of our cities.

/ **Modelling and reconstruction of historical space**

/ **Modelling and simulation of interactions in space**

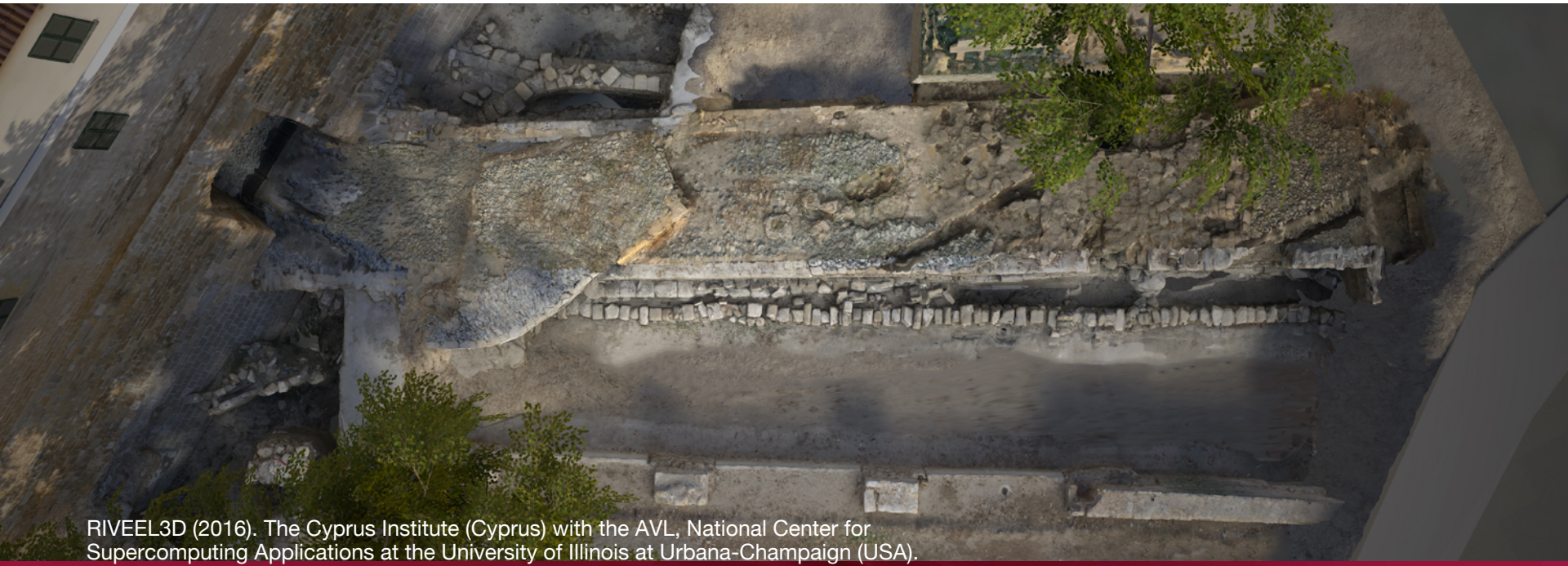
Modelling and Simulation

/ Modelling and reconstruction of historical space

The development of new practices of historical site reconstruction that enabled the creation of virtual spaces in the 1990s (Reilly, 1990; Barcelo et al., 2000) has made it possible for anyone to *be* in an imagined past, to manipulate it, or to create it.

Reilly, P. (1990). Towards a virtual archaeology. In *Computer Applications in Archaeology*. Edited by K. Lockyear and S. Rahtz, 133–139. Oxford: BAR 565.

Barcelo, J.A., Forte, M., and Sanders, D.H. (2000). *Virtual Reality in Archaeology*. Oxford: ArcheoPress BAR 843.

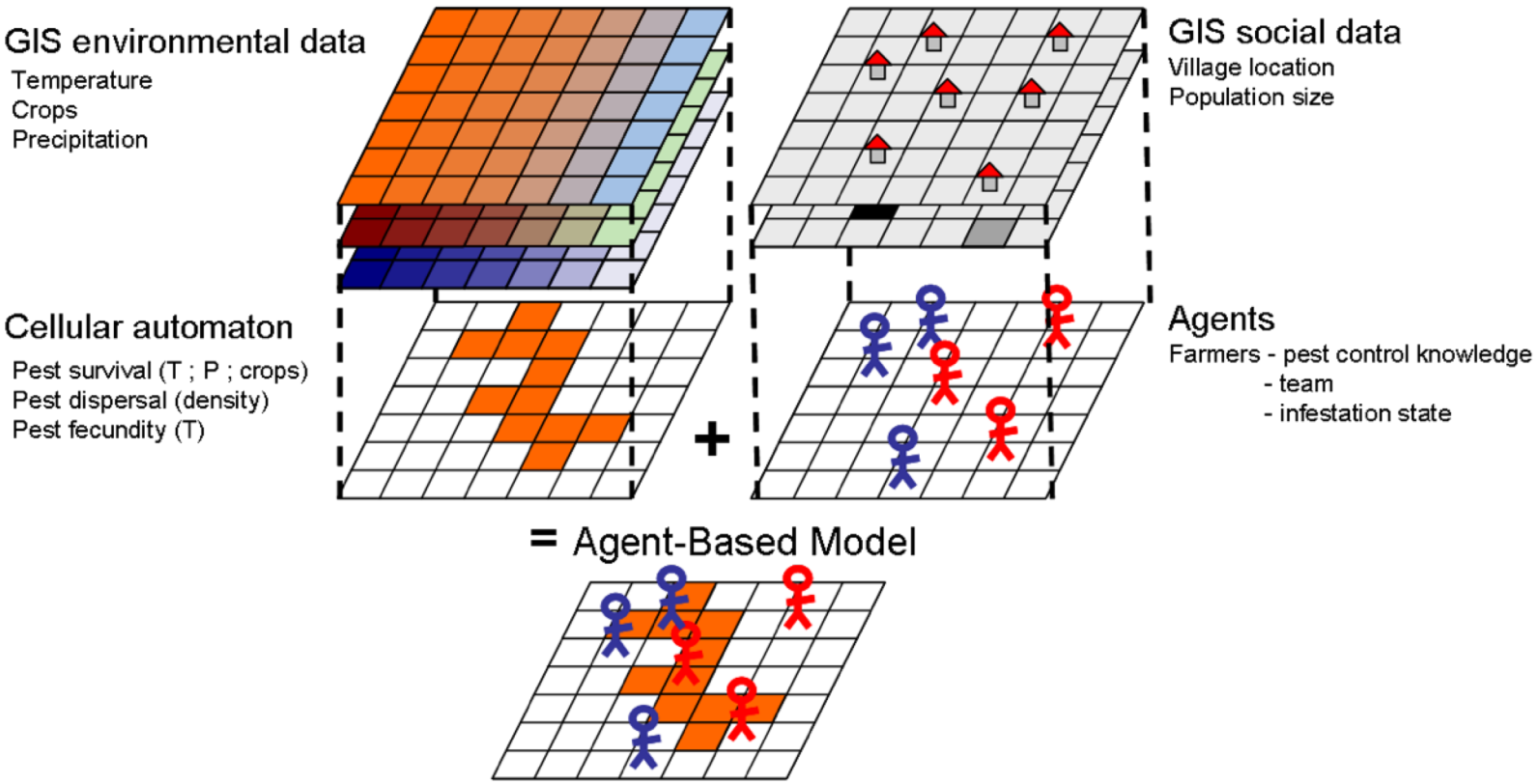


RIVEEL3D (2016). The Cyprus Institute (Cyprus) with the AVL, National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign (USA).

/ Modelling and simulation of interaction in space

Computer simulation subtly shifts the focus of modelling from asking “how it works” to “how it got to be as it [was]” (Allen and McGlade 1987, p. 724).

Allen P, McGlade J (1987) Evolutionary drive: the effect of microscopic diversity. Found Phys 17:723–738.



/ Modelling and simulation

Intentions:

- To **test hypotheses:** determine what happened in the past by comparing the output of a simulated process against the evidence.
- To support **theory building**: the purpose is not to explain what happened in the past, but rather to understand/interpret how certain processes work.
- To develop new methods, usually by assessing the ability of those methods to identify meaningful patterns from a known (simulated) reality ('**methodological simulation**').

/ Modelling and simulation: Agents

Typical set of requirements (Ferber 1999: 9–10) includes that agents should be:

- Autonomous (directed by their own goals),
- Goal-directed (behave in an attempt to achieve their goals),
- Reactive (change their behaviour in response to the properties of the environment), and
- Situated (have an explicit location in the environment).

Agents may additionally:

- Maintain a representation of their world and thus be capable of cognition,
- Be social in the sense of interacting with other agents (based on behavioural patterns), and
- Be capable of reproduction involving some kind of recombination or mutation of their attributes.

Ferber (1999) Multi-agent systems: an introduction to distributed artificial intelligence. Addison-Wesley, Harlow.

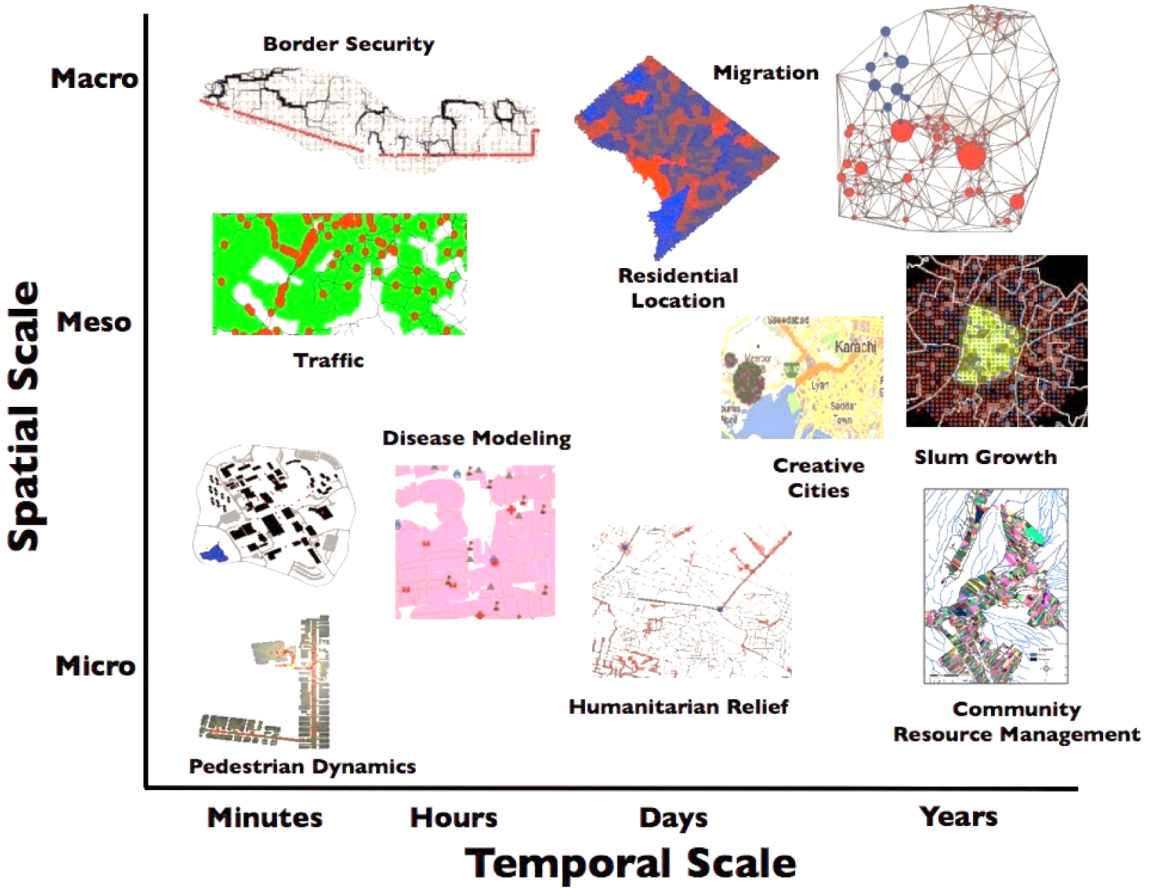
/ Modelling and simulation in Archaeology: Problems explored

- Demography and information exchange [Wobst, H. M. (1974). Boundary conditions for Palaeolithic social systems: a simulation approach. American Antiquity, 39, 147–178].
- Hunter–gatherer subsistence strategies [Thomas, D. H. (1972). A computer simulation model of Great Basin Shoshonean subsistance and settlement. In D. L. Clarke (Ed.), Models in archaeology (pp. 671–704). London: Methuen].
- Settlement patterns of small-scale societies [Cordell, L. S. (1972). Settlement Pattern Changes at Wetherill Mesa, Colorado: A Test Case for Computer Simulation in Archaeology. PhD thesis, University of California, Santa Barbara].
- Colonisation [Levison, M., Ward, R., & Webb, J. (1973). The Settlement of Polynesia: A Computer Simulation. Minneapolis: University of Minnesota Press].
- Study trade and exchange [Hodder, I., & Orton, C. (1976). Spatial Analysis in Archaeology. Cambridge: Cambridge University Press]; [Wright, H. T., & Zeder, M. (1977). The simulation of a linear exchange system under equilibrium conditions. In T. K. Earle & J. E. Ericson (Eds.), Exchange systems in prehistory (pp. 233–253). New York: Academic Press]; [Elliott, K., Ellman, D., & Hodder, I. (1978). The simulation of Neolithic axe dispersal in Britain. In I.Hodder (Ed.), Simulation Studies in Archaeology (pp. 79–87). Cambridge: Cambridge University Press].
- Rise and fall of entire civilisations (Hosler, D., Sabloff, J. A., & Runge, D. (1977). Simulation model development: A case study of Classical Maya collapse. In L. H. Gunderson, C. S. H. and Light, S. S., editors, Social Processes in Maya Prehistory, pages 552–590. London: Academic Press]; [Cooke, K. L., & Renfrew, C. (1979). An experiment on the simulation of culture changes. In C. Renfrew & K. L. Cooke (Eds.), Transformations: Mathematical Approaches to Culture Change (pp. 327–348). New York: Academic Press]; [Zubrow, E. (1981). Simulation as a heuristic device in archaeology. In J. A. Sabloff (Ed.), Simulations in archaeology (pp. 143–188). Albuquerque: University of New Mexico Press].

/ Modelling and simulation in spatial research: Problems explored

Agent-based modelling includes the construction of spatial models.

These space representations range from an abstract ‘grid’ or raster representation of a synthetic ‘landscape’, through a similar representation of real geographical space to direct integration with a GIS.



/ Modelling and simulation in:

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. design & planning, with computational & parametric tools

/ Modelling and simulation in:
. Archaeological space research

SensiLab

SensiLab Team

Dr Tom Chandler

Brent McKee

Mike Yeates

MONASH University

History Team

Associate Professor Adam Clulow

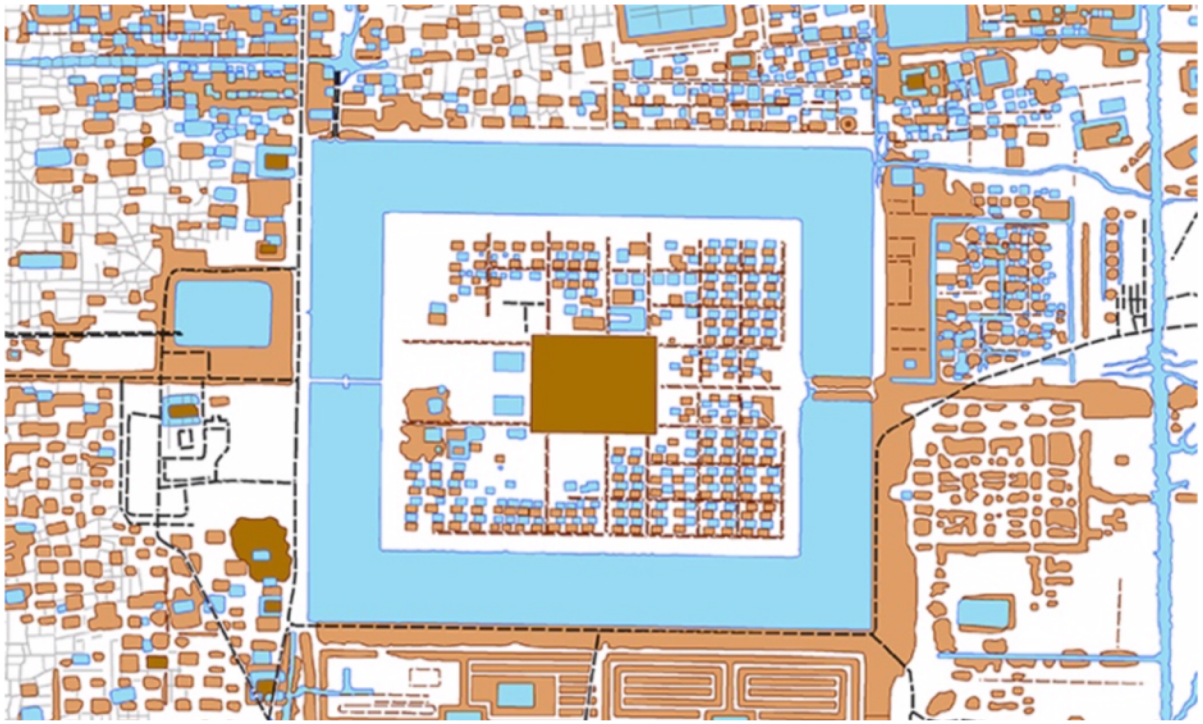
Bernard Keo

Samuel Horewood

Flinders UNIVERSITY

Consultants

Dr Martin Polkinghorne



Visualising 24 Hours at Medieval Angkor Wat

Archaeological map of Angkor Wat and its surrounding environment (based on LiDAR data) (Khmer Archaeology Lidar Consortium).

/ Modelling and simulation in:
. Archaeological space research

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Aerial view in the simulated environment over the West corridor.

/ Modelling and simulation in:
. Archaeological space research

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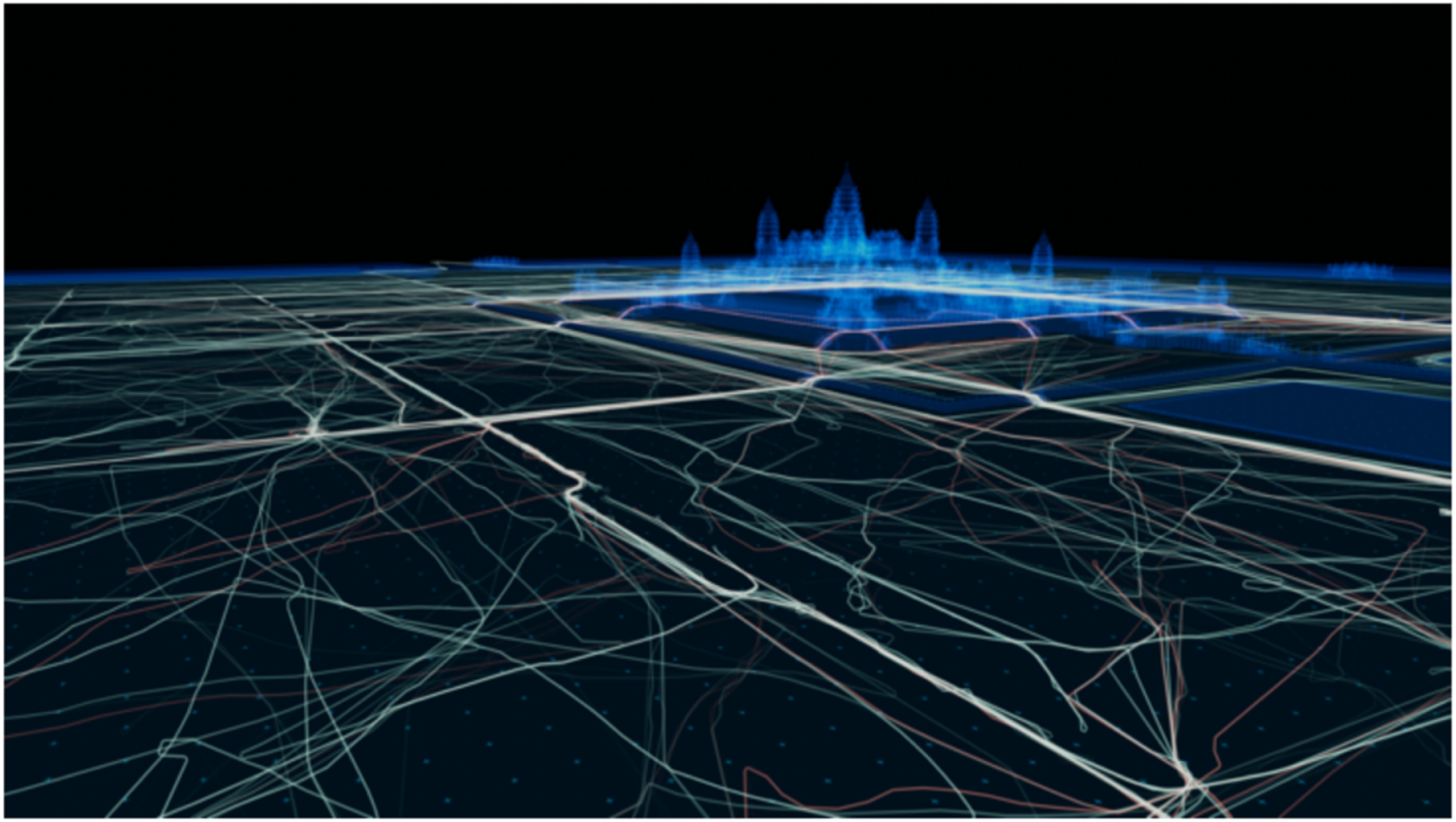

Agent based model visualized in 'x-ray' mode.

/ Modelling and simulation in:

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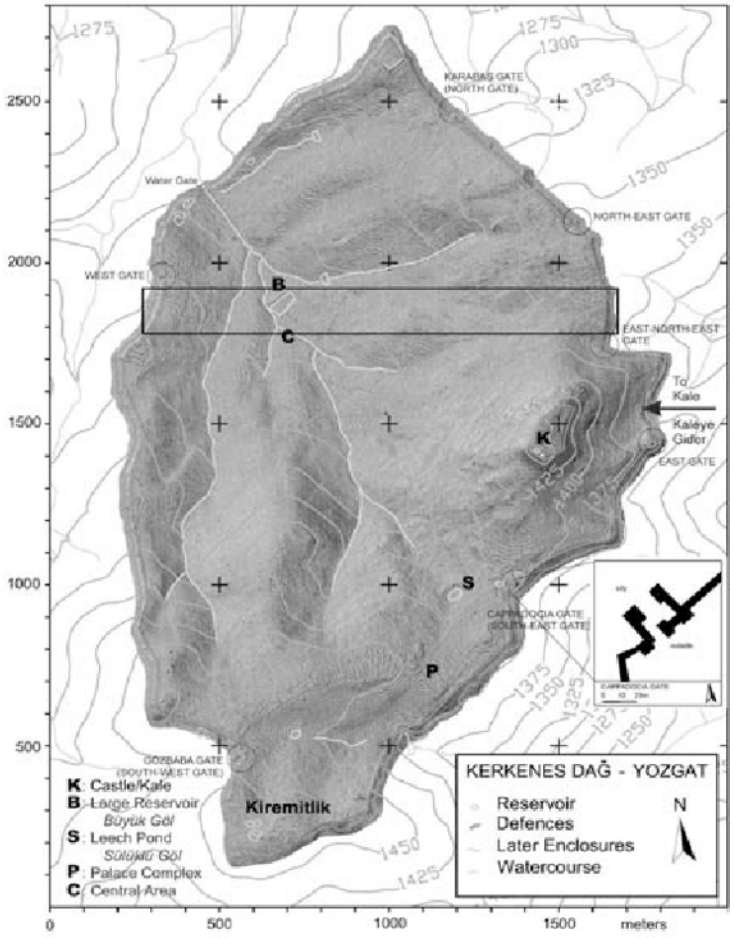
. design & planning, with computational & parametric tools

/ Modelling and Simulation: crowd simulation in virtual environments



Cayirezmez, Nurdan Atalan and Geoffrey D. Summers. “Remote Sensing At Kerkenes: Combining Geophysical and Other Methods Kerkenes'de Uzaktan Algilama: Jeofizik ve Diğer Yöntemlerin Birleştirilmesi.” (2008).

SHULGI was developed to integrate multiple modelling techniques and GIS for the purpose of simulating pedestrian movement; its application to Kerkenes Dağ, a 6th c BC Iron Age site in Turkey ‘determined areas of potential archaeological significance and direct further investigations through field excavations or other archaeological techniques’.

Branting, S., Wu, Y., Srikrishnan, R., & Altaweel, M. R. (2007). SHULGI: A geospatial tool for modeling human movement and interaction. In Proceedings of Agent 2007:Complex Interaction and Social
Emergence, pages 475–488, Chicago.

a

b

c

d

e

Each image depicts representative virtual cultural heritage reconstructions of ancient sites populated with VHs: a: Hagia Sophia; b: German town of Wolfenbüttel; c: Stadium in ancient Olympia, Greece; d: Ancient Pompeii; e: The Sumerian city of Uruk.

Comparative assessment of virtual human applications in cultural heritage.

Application	Type	Virtual Human	User interaction	Key implementation features	Year
Church Of Hagia Sophia [44]	3D virtual environment	Crowd (people)	Not possible	3D model created using 3D Studio Max 4.2	2002
Namaz Pray [50]	3D virtual environment	Single (Ottoman Imam praying)	Not possible	VHD++ real-time framework	2003
Ancient Pompeii [32]	3D virtual environment	Crowd (roman citizens)	Not possible	3D model created based on CityEngine with a semantic data navigation graph	2007
Wolfenbüttel [47]	3D virtual environment	Single (guide)	Q&A chat-based interaction	ARP UEA Scene Assembly Toolkit	2007
St Andrews Cathedral [56]	3D virtual environment	Single (user's avatar shown in either first or third-person perspective) + multiple (non-playing characters populating the church)	User can interact with Non-player characters that populate the environment in both textual and audile conversations	Open Virtual Worlds; OpenSim; Oculus Rift	2013
John Calvin [49]	3D virtual environment	Single (John Calvin)	Not possible	Zbrush; Miralab's Fashionizer; VICON	2014
Georgetown [53]	3D virtual environment	Crowd (town inhabitants)	The virtual humans interact in advanced scenarios, but no user interaction is possible	Unity 3D	2016
Archeoguide [48]	Augmented reality	Crowd (athletes)	Not possible	GIS photos; VRML 3D reconstructed models	2002
ARmuseum [63]	Augmented Reality (Mobile)	Single (guide)	The virtual guide gives the user instructions on how to complete the tasks	Game engine middleware software	2013
Le Boullongne [52]	Immersive 3D virtual environment	single (user's avatar) + multiple (sailors)	The user can interact through his avatar with different items on the ship	3DsMax 2013; Unity 3D; MiddleVR	2015
AMICA [51]	Immersive 3D virtual environment	Single (user's hands avatar) and multiple (artisans shown as 3D videos)	The user can interact through his avatar with the environment and might see "through the artisan's eyes" how the artwork is created	XVR; Oculus Rift; Microsoft Kinect and Primesense Carmine for 3D capture	2015
Virtual agora [57]	Immersive 3D virtual environment	Single (user's avatar) + multiple (people walking around the square)	User's avatar can interact with NPCs through conversation, storytelling, quests and other activites	Open Virtual Worlds; OpenSim	2016
Muru in Wonderland [65]	Immersive interactive 3D video tour	Single (toon-like anthropomorphic virtual character as a guide)	Users interact with the VH through storytelling but also physical (haptic) contact	Oculus Rift; Unity 3D	2016
Max [30]	Screen projected VH	Single (museum guide)	Keyboard-based input, spoken natural language output and camera-based visual perception	VH modelled using the Behavior Expression Animation Toolkit (BEAT)	2005
Ada and Grace [31]	Screen projected VH	Single (museum guide	Spoken natural language based input and output	Smartbody (SBM) behavior realization system; Gamebryo animation engine: SONIC toolkit	2010
Tinker [8]	Screen projected VH	Single (museum guide)	Keyboard-based input, spoken natural language output.	VH modelled using the Behavior Expression Animation Toolkit (BEAT)	2011
"Gossip at palace" [64]	Serious game (Mobile)	Single (museum guide) + multiple (16 characters animating the game)	Chat-based conversation with dialogue branches	Android application	2015
Mediaevo Project [60]	Serious game 3D virtual environment	Multiple (city inhabitants)	User can play as the avatar	Nintendo Wiimote and Balance Board	2011
Imago Bononiae [61]	Serious game 3D virtual environment	Single (user's avatar) + crowd (inhabitants of the ancient Bologna)	The user's avatar can navigate the environment populated with non-player virtual characters (NPCs) but cannot interact with them	Microsoft Kinect	2015
The City Of Uruk [41]	Serious game 3D virtual environment	Multiple (city inhabitants)	Q&A chat-based interaction	3D design of the city using Unity	2009

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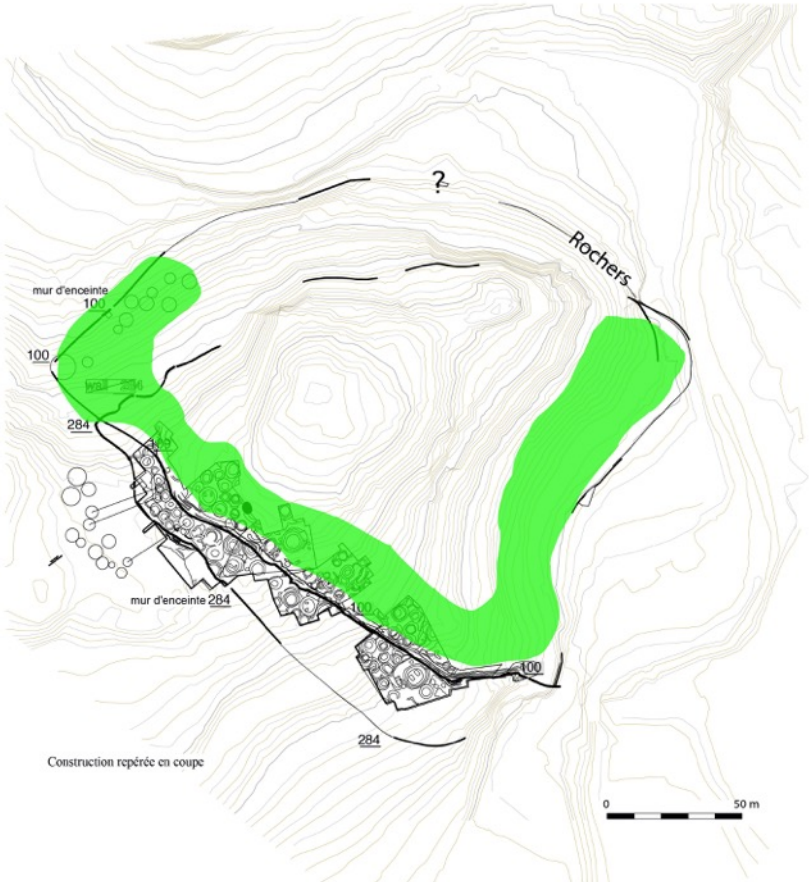
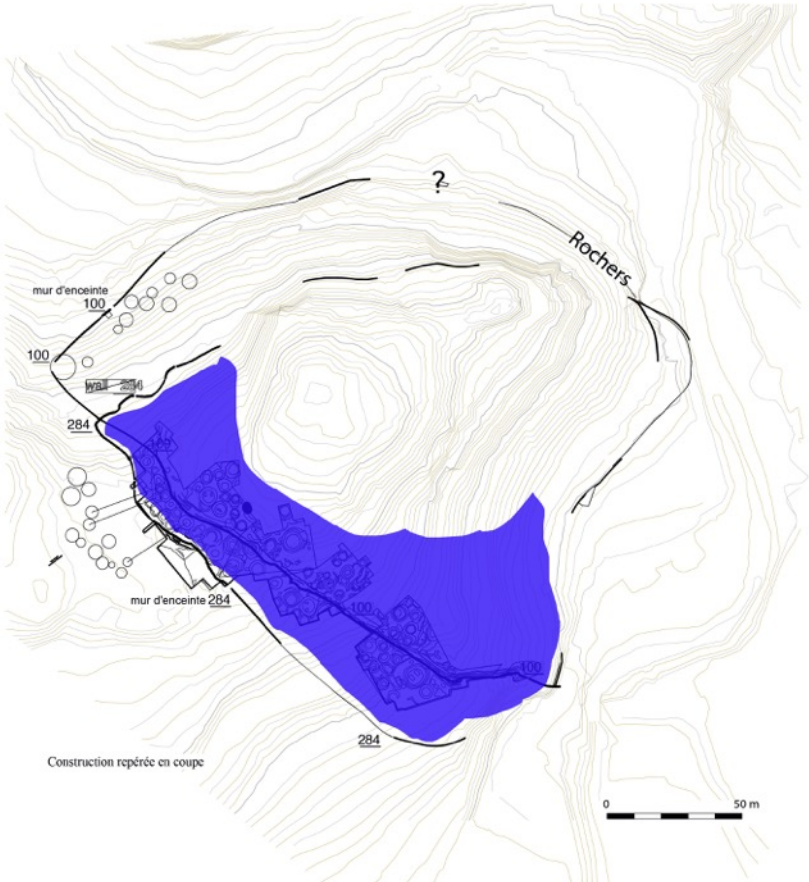
FIGURE 7.2. Khirokitia. General view of the southern hillside (photo Th. Saggory) with the two successive walls enclosing the Neolithic village (Photos Mission Archéologique Française).

/ Modelling and simulation in:
. Archaeological space research



Settlement occupied area during the 1st inhabitation phase 7-5.000 BC.

/ Modelling and simulation in:
. Archaeological space research



Settlement occupied area during the 2nd inhabitation phase 4-3.000 BC.

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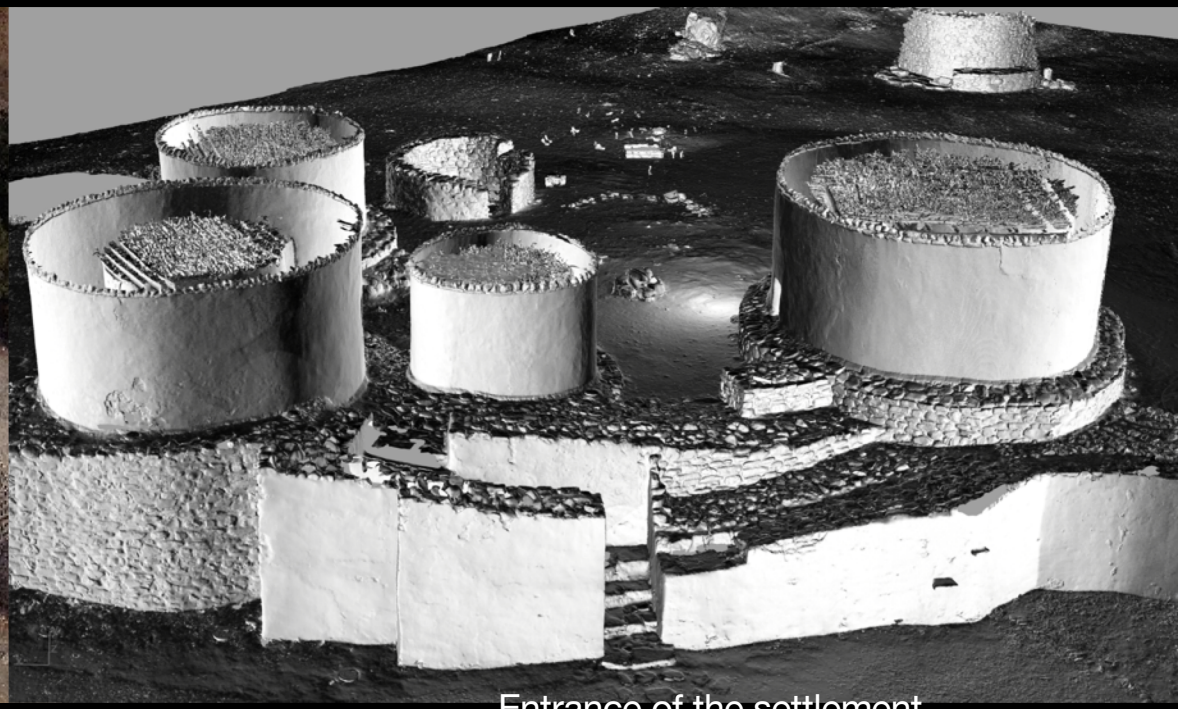
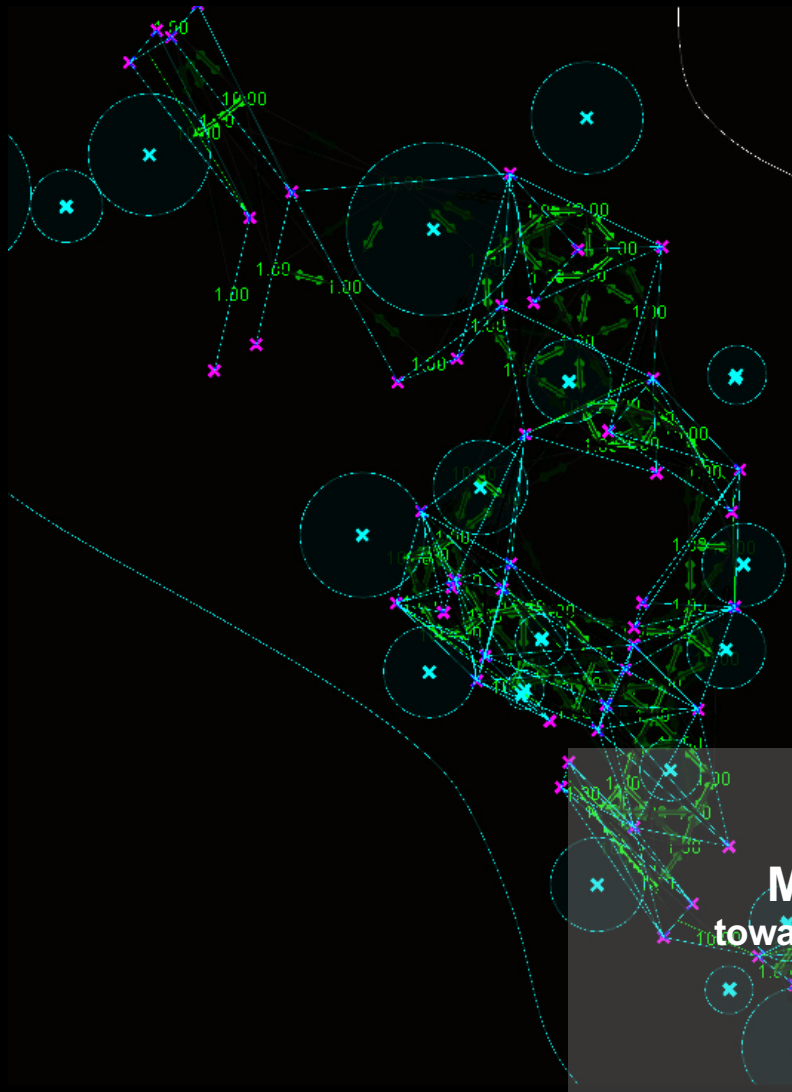
Physical reconstruction of a family house / cluster



Entrance of the settlement (1st inhabitation phase)

/ Modelling and simulation in:
. Archaeological space research



Identify topological relations

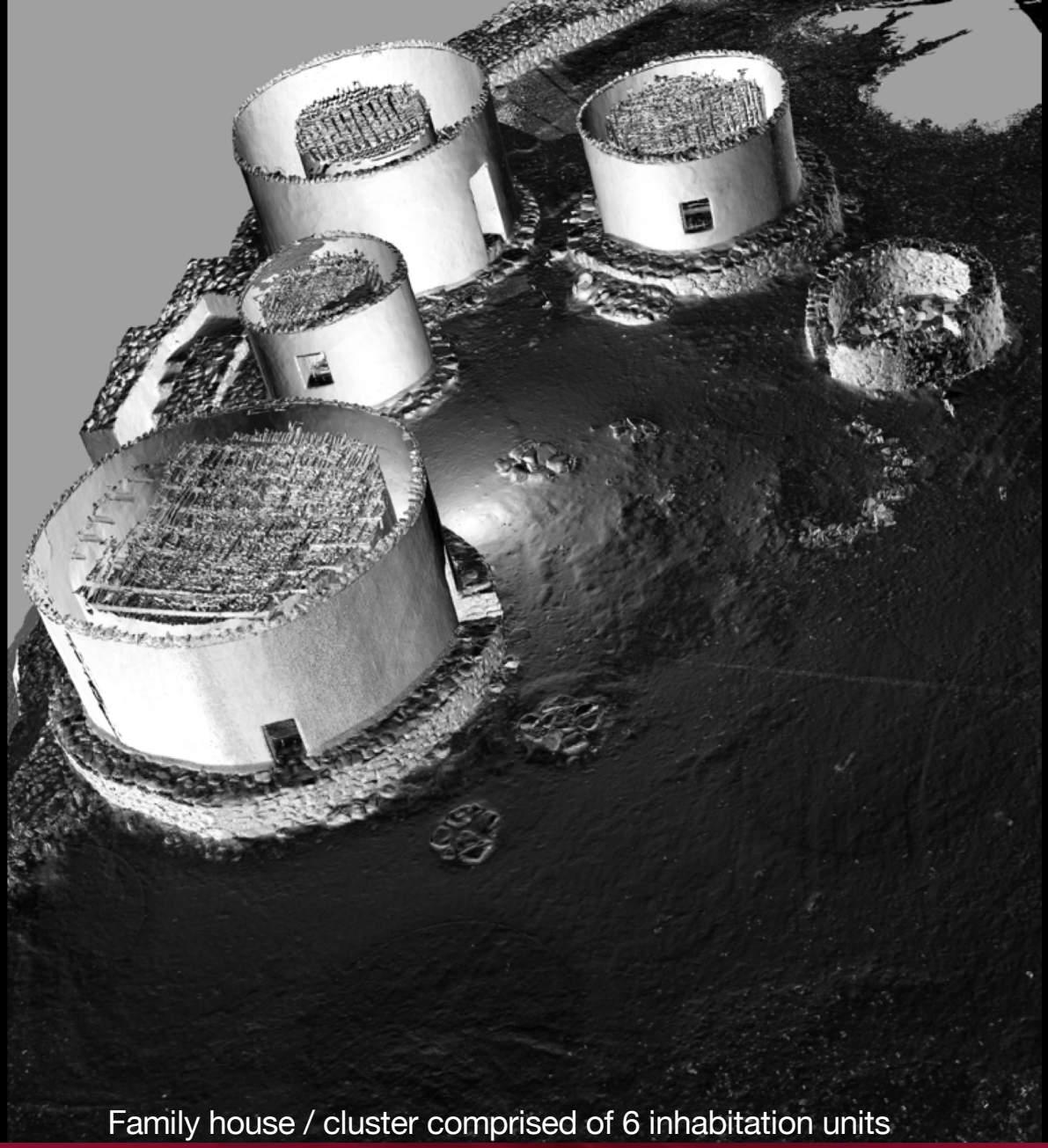
…transformed chronologically

- Central areas
- Peripheral zones
- Circulation

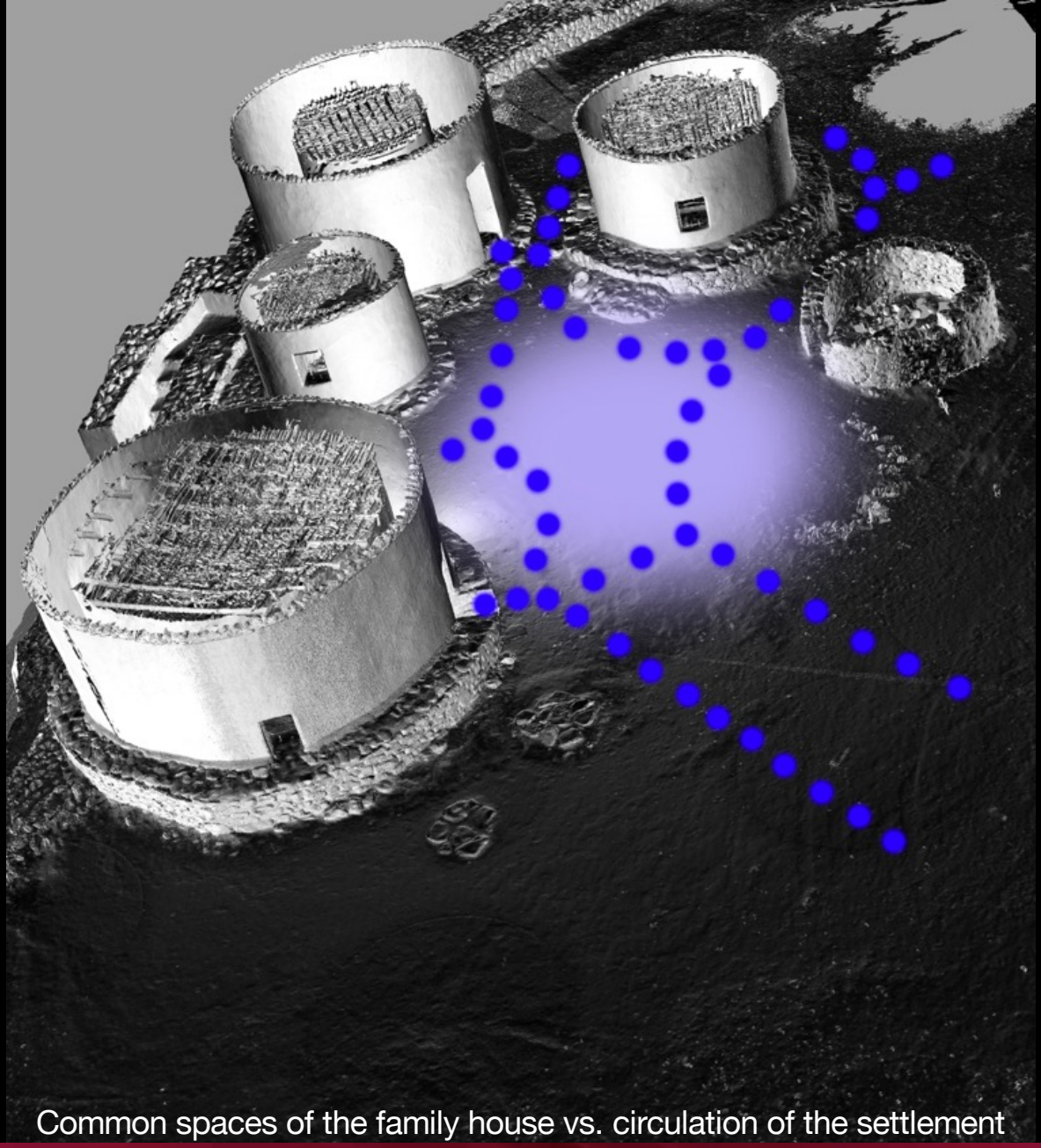
Modelling Spatial Relations at Khirokitia:
towards simulating communal spaces as proto-public space

Iza Romanowska, Georgios Artopoulos and Odile Daune-Le Brun.

Computational Applications in Archaeology 2019, Krakow, April 23-27, 2019.



Family house / cluster comprised of 6 inhabitation units



Common spaces of the family house vs. circulation of the settlement

Modelling Movement

What do we want to know?

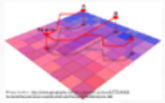
- Where did people go?
- Why did they go there?
- Why did they build where they did?
- Which areas were 'important'?
- Which areas were 'suburbian'?

Data available: none

Modelling Movement

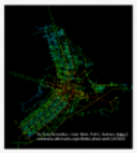
What can we do?

Analytical methods

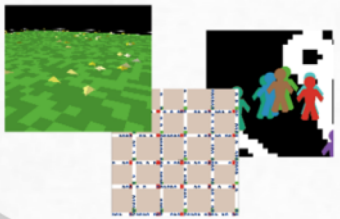


Least-cost paths

Space syntax

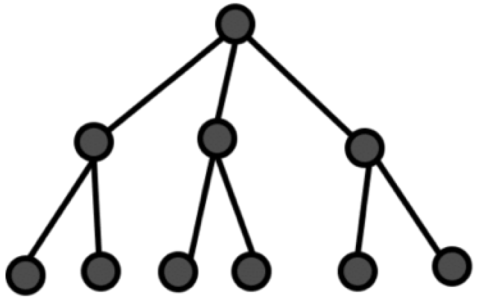


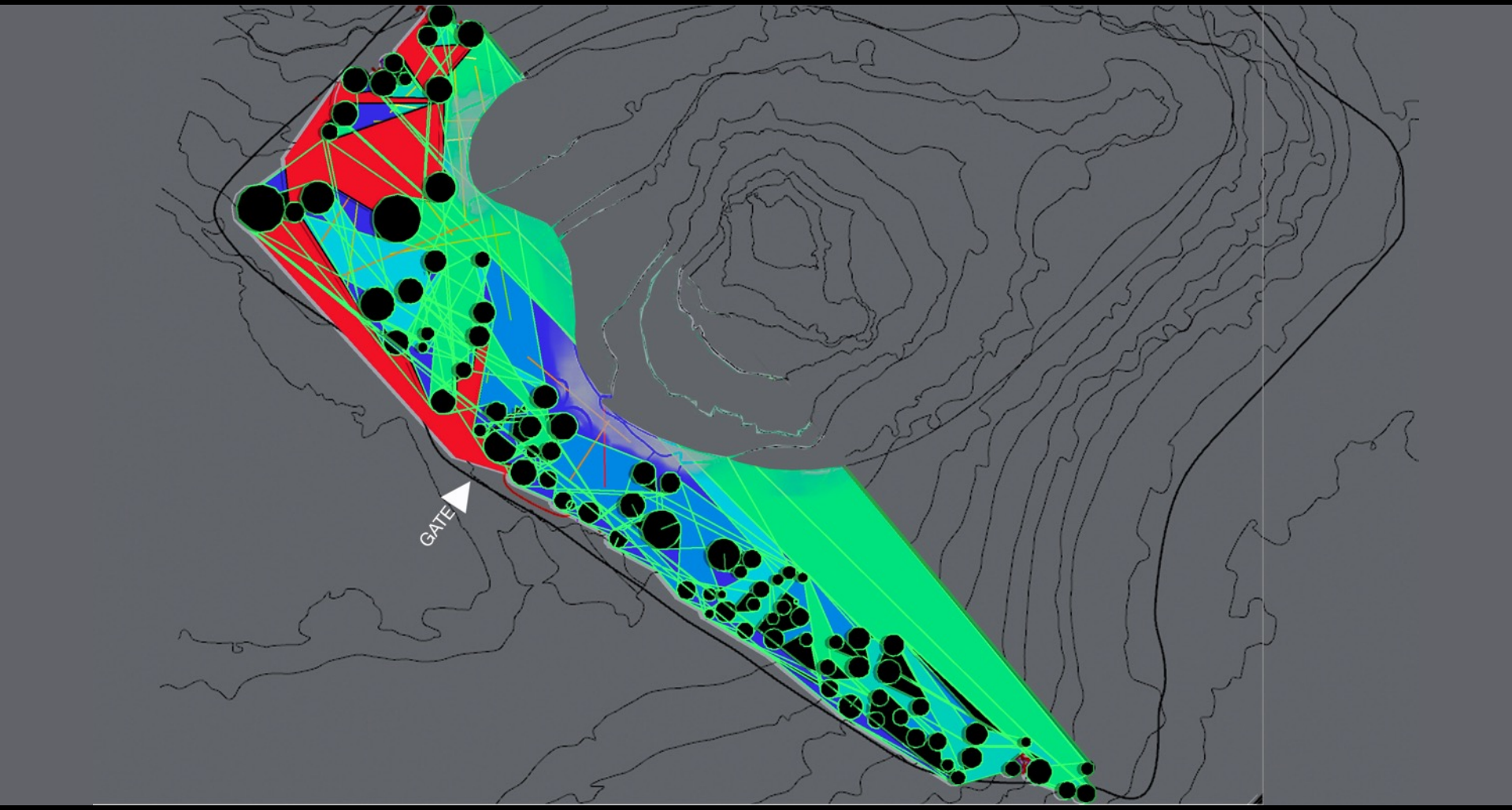
Stochastic methods



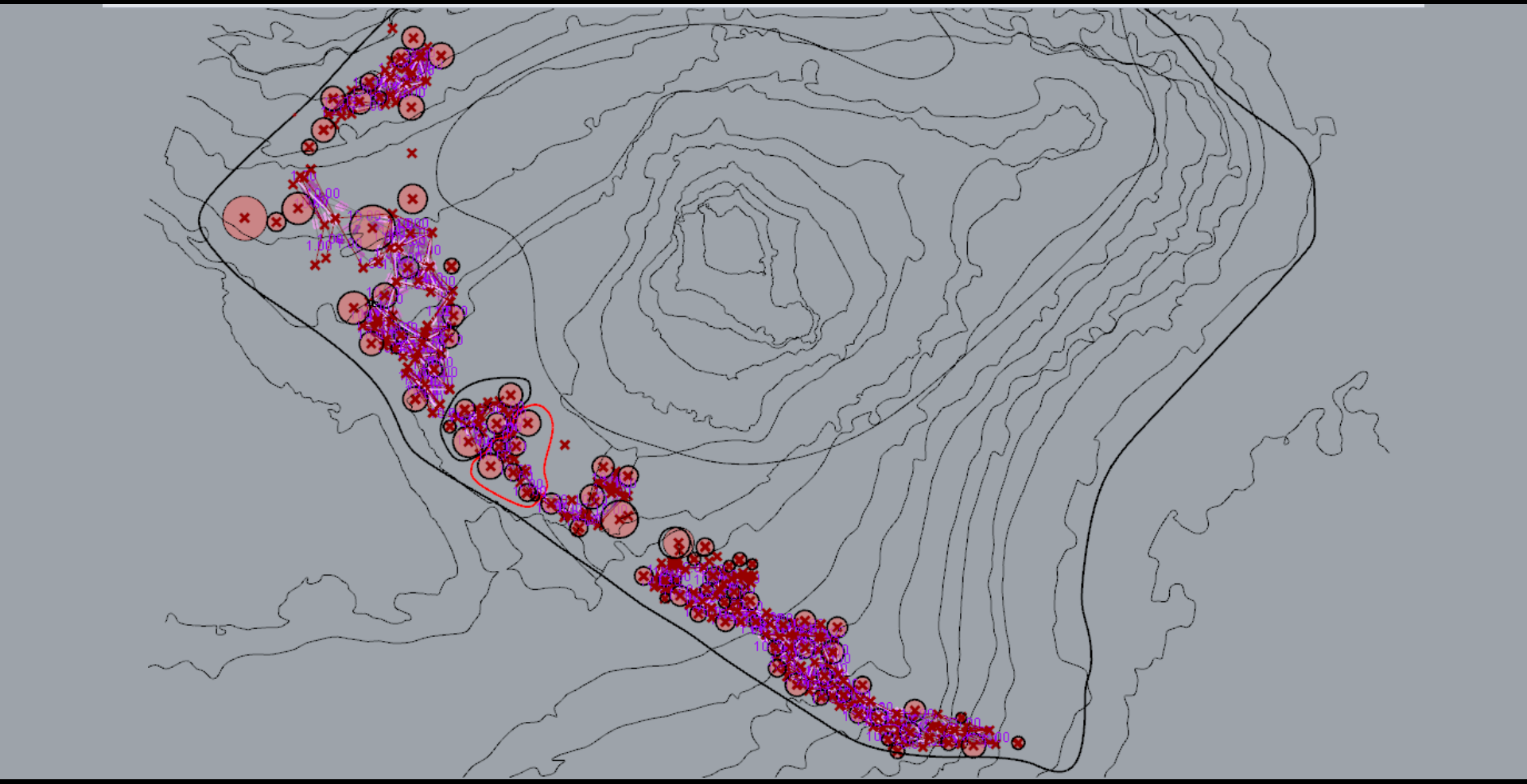
Agent-based modelling

Top down \ analytical methods

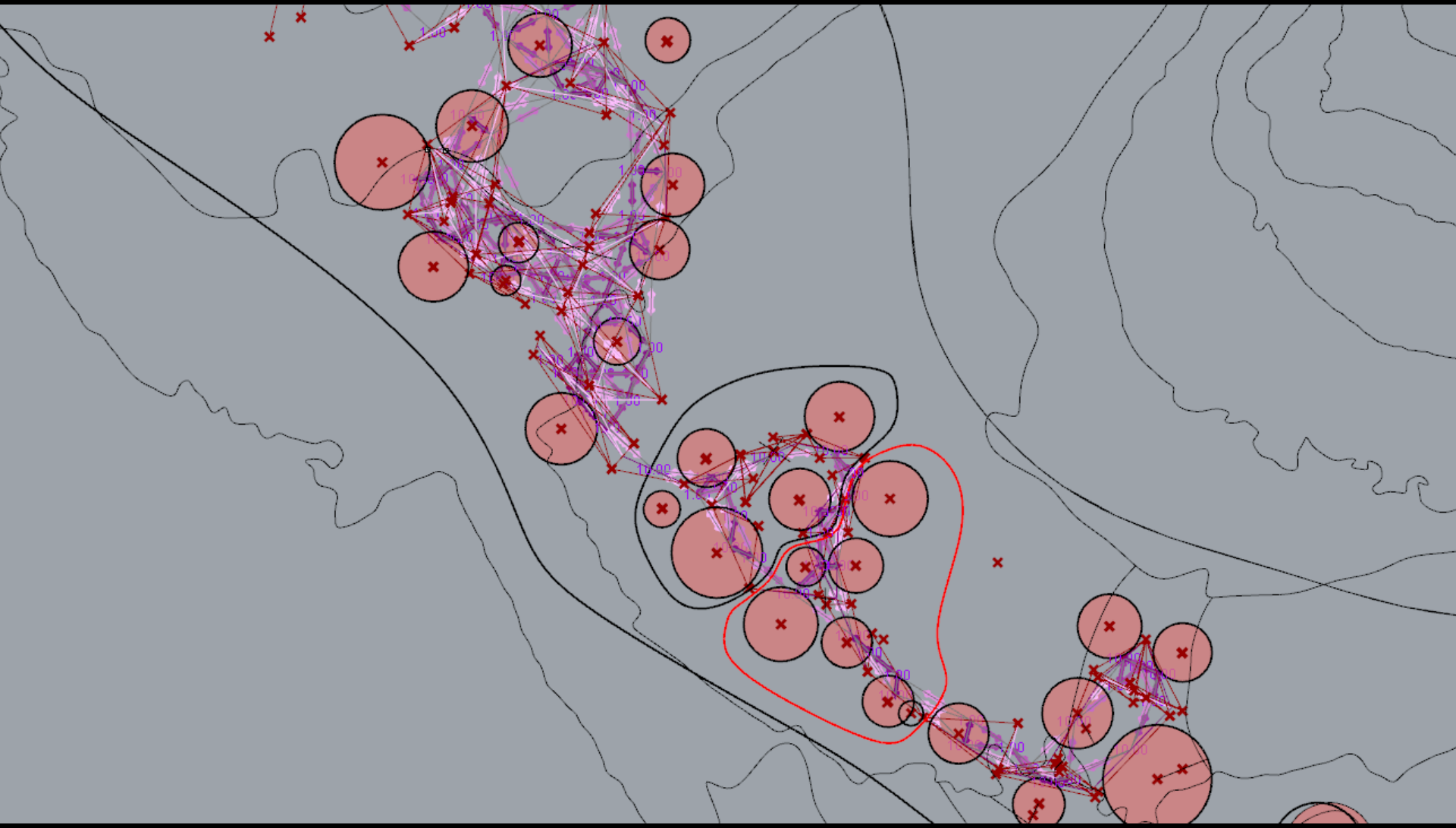




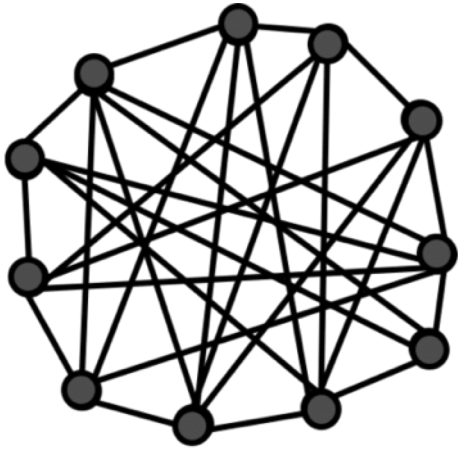
Analytical methods: **Space Syntax Depthmap** (isovistas from each communal space)



Analytical methods: **Network Centrality**
(Graph of connectivity of open space around clusters of inhabitation units)



Bottom up \ stochastic methods



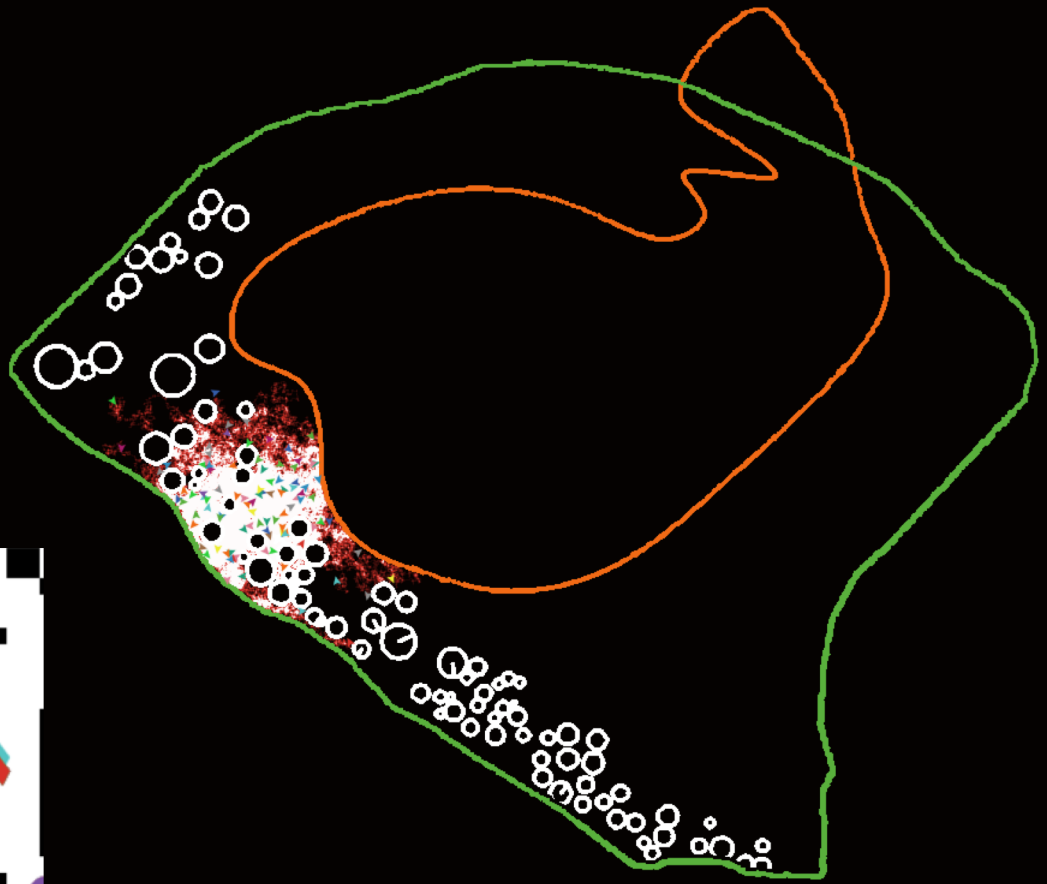
How do people walk?

- random
- forward
- from point A to point B
- a mix of all above

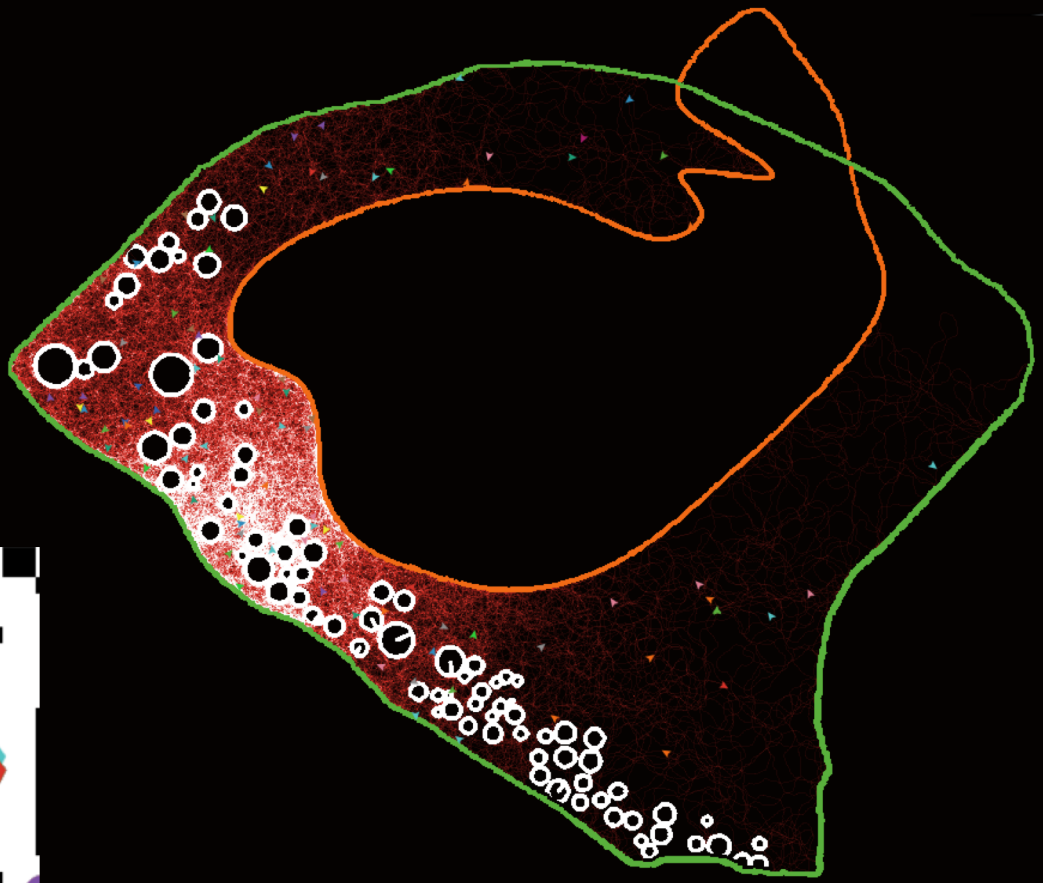
Where do they start?

- at a random point
- at the entrance
- at their house

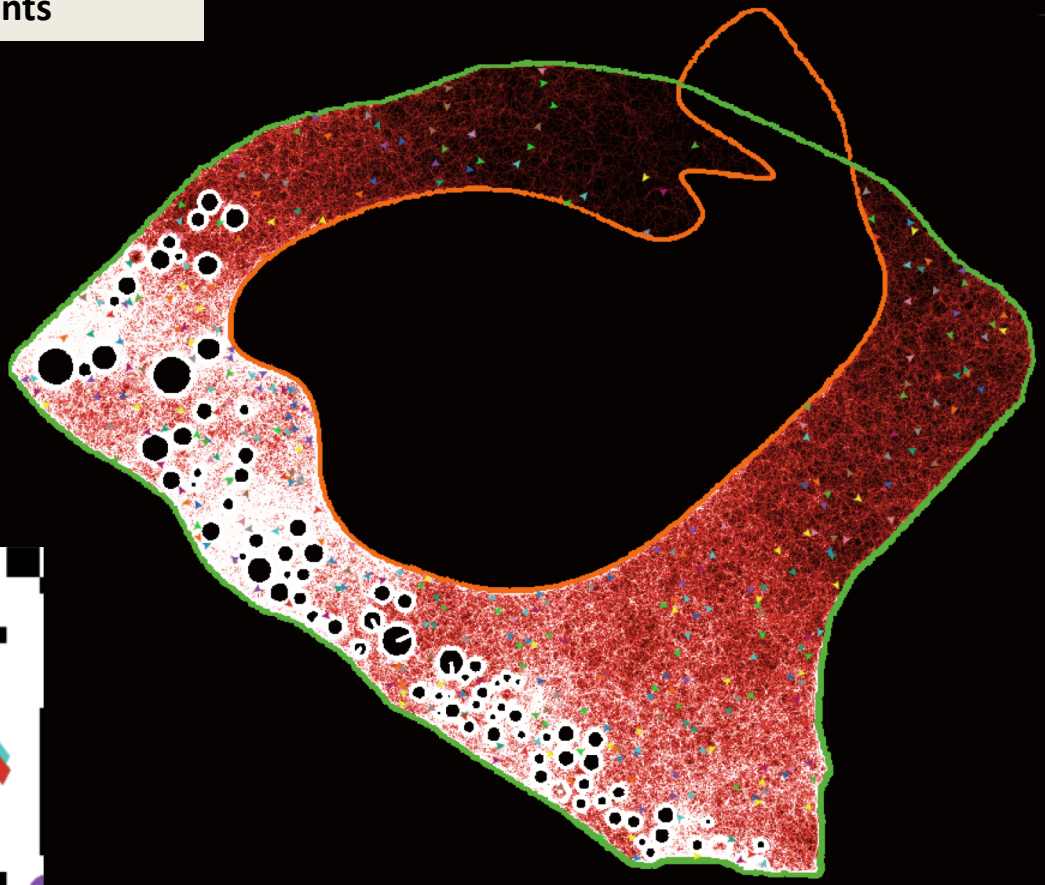
Random Walk

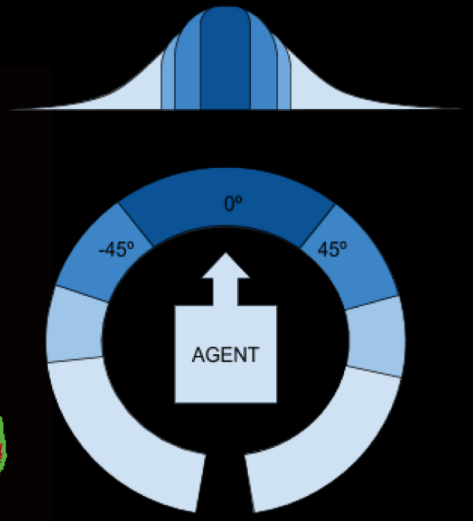


Correlated Random Walk

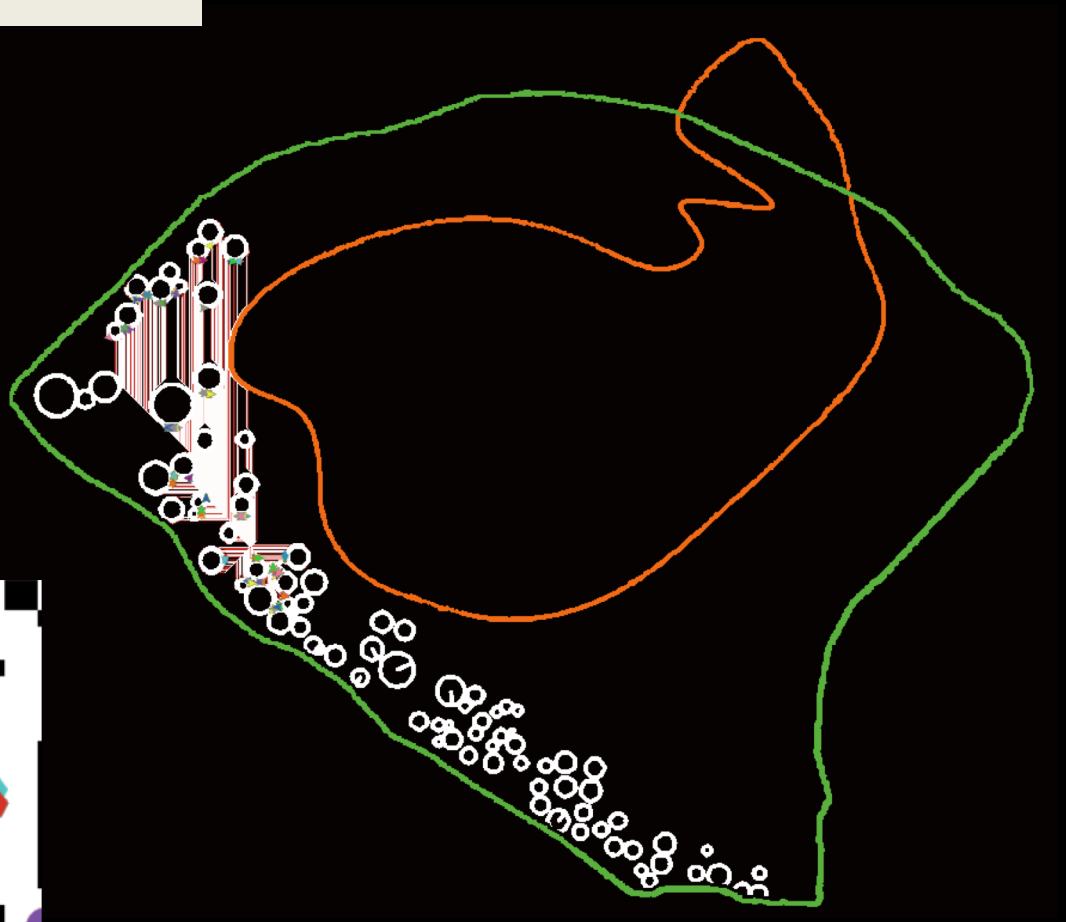


Correlated Random Walk
Random starting points





Targeted Walk



TO BE CONTINUED….

ICAS-EMME 2

HOME | PROGRAM | REGISTRATION | TRAVEL | ORGANIZERS | KEY DATES

KEY EXTERNAL LINKS

- The Cyprus Institute
- STARC at CyI
- PROMISED - H2020 Twinning Project
- APAC Labs
- Hellenic Society for Archaeometry
- Society for Archaeological Sciences
- Visit Cyprus

2nd International Congress on Archaeological Sciences in the Eastern Mediterranean and the Middle East (ICAS-EMME 2)

12-14 November 2019

The Cyprus Institute, Nicosia, Cyprus

The Science and Technology in Archaeology and Culture Research Center (STARC; http://starc.cyi.ac.cy/) of the Cyprus Institute (http://www.cyi.ac.cy/) is pleased to announce the dates for the 2nd *International Congress on Archaeological Sciences in the Eastern Mediterranean and the Middle East* (ICAS-EMME 2). This international congress aims to highlight recent advances in natural, material and computational science applications to archaeology and cultural heritage in the Eastern Mediterranean and the Near East, and to provide an international academic forum for dissemination of results of current research in these fields in the region. The congress is addressed to the international scientific community of archaeologists, archaeological & heritage scientists, and researchers applying natural, material and computational science methods to archaeology and cultural heritage in the Eastern Mediterranean and the Middle East.

https://icasemme2.cyi.ac.cy/

Our session invites papers that seek to examine Mediterranean city networks, city life, and urban structure by using computational methods, such as:

- complexity theory and use of historical data in urban simulations;
- modelling / mapping of uncertainty;
- spatial interaction models;
- urban modelling and space syntax;
- urban morphology;
- geo-spatial data and simulation;
- agent-based modelling, cellular automata, neural networks, swarm behaviour and emergence in archaeological studies;
- virtual environments and real-time interactive visualisation of urban/spatial data, for immersion, education and interpretation purposes.

https://icasemme2.cyi.ac.cy/

/ Modelling and simulation in:

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/ Modelling and Simulation: current approaches in archaeology

Use of simulation for modelling:

- Reaction–diffusion phenomena (complex systems). *Researchers applying the dynamical systems perspective on morphogenesis have shifted their focus to 'human ecodynamics' or 'socio-natural studies', i.e., the study of the complex interactions between societal and environmental change that play out over long timescales.*

This approach has been applied in archaeology to the:

- Neolithic spread of agriculture in Europe.
- Recolonisation of northern Europe.
- Colonisation of the western Pacific.
- Spread of European American settlers.

/ Modelling and Simulation: current approaches in archaeology

Use of simulation for modelling:

- Reaction–diffusion phenomena (complex systems). *There is greater environmental realism in reaction–diffusion models, through the explicit inclusion of environmental heterogeneity, and human impact on the environment*.

Young and Bettinger (1995) and Steele et al. (1996) both used Fisher–Skellam type reaction–diffusion equations to model population growth and dispersal across grids representing the Old World and North America, respectively.

Young, D. A., & Bettinger, R. L. (1995). Simulating the global human expansion in the Late Pleistocene. Journal of Archaeological Science, 22, 89–92.
Steele, J., Sluckin, T., & Denholm, D. (1996). Simulating hunter-gatherer colonization of the Americas. In H. Kamermans & K. Fennema (Eds.), Interfacing the Past, number 28 in Analecta Praehistorica Leidensia (pp. 223–227). Leiden: Institute of Prehistory, University of Leiden.

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. Architecture research on contemporary (historic) urban spaces

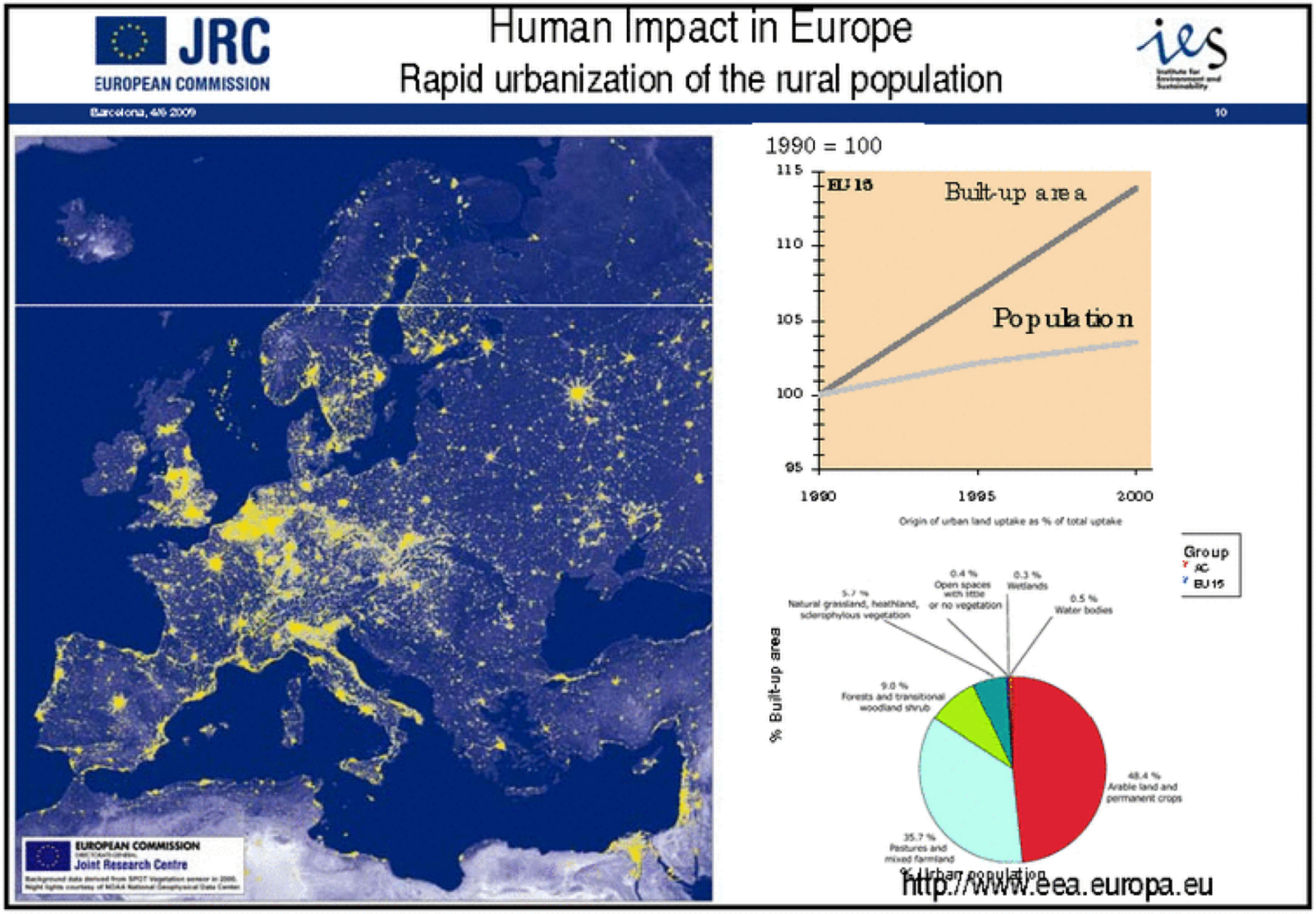
/ Modelling and simulation for:

. visualisation & spatial reconstruction methods

. crowd simulation in virtual environments

. built environment research, with ABM

. design & planning, with computational & parametric tools

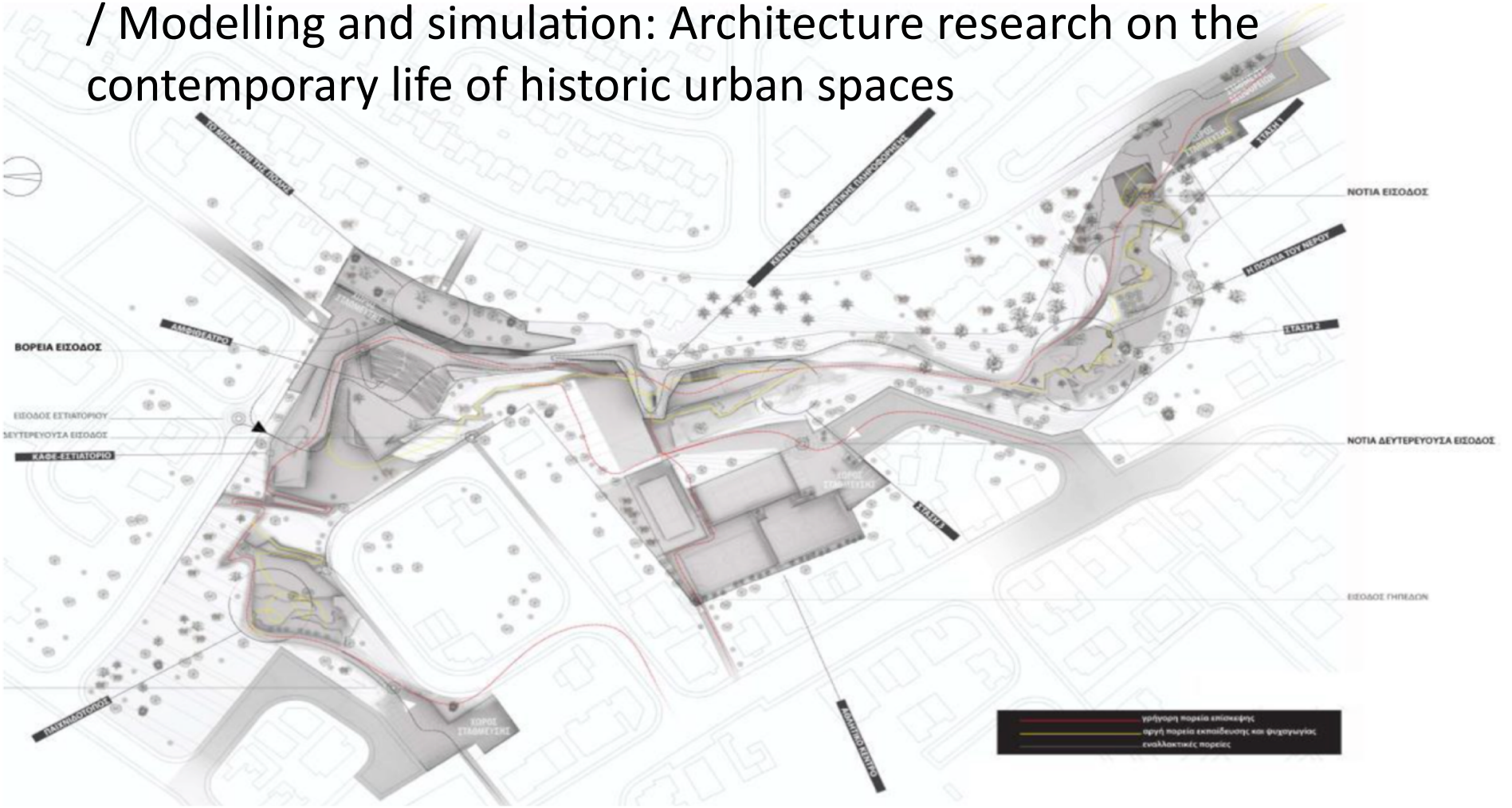


Rapid **urbanization, migration and economic challenges** impact European territories with ever-growing plurality of cultures and identities that appropriate shared spaces.

Public Open Space (POS) is a key element of our cities. It can be defined as outdoor urban spaces of any size, design or physical features, *which are readily and freely available to the public for amenity, recreation, and socialisation purposes*.

Lemonides J. S. & Young A. L. (1978). Provision of Public Open Space in Urban Areas: Determinants, Obstacles, and Incentives. *Journal of the American Institute of Planners*, 44(3), 286-296.

/ Modelling and simulation: Architecture research on the contemporary life of historic urban spaces



2nd prize, International Architectural Competition for a Park of Environmental Education, Nicosia, Cyprus 2012.

***Design Team credits**:*

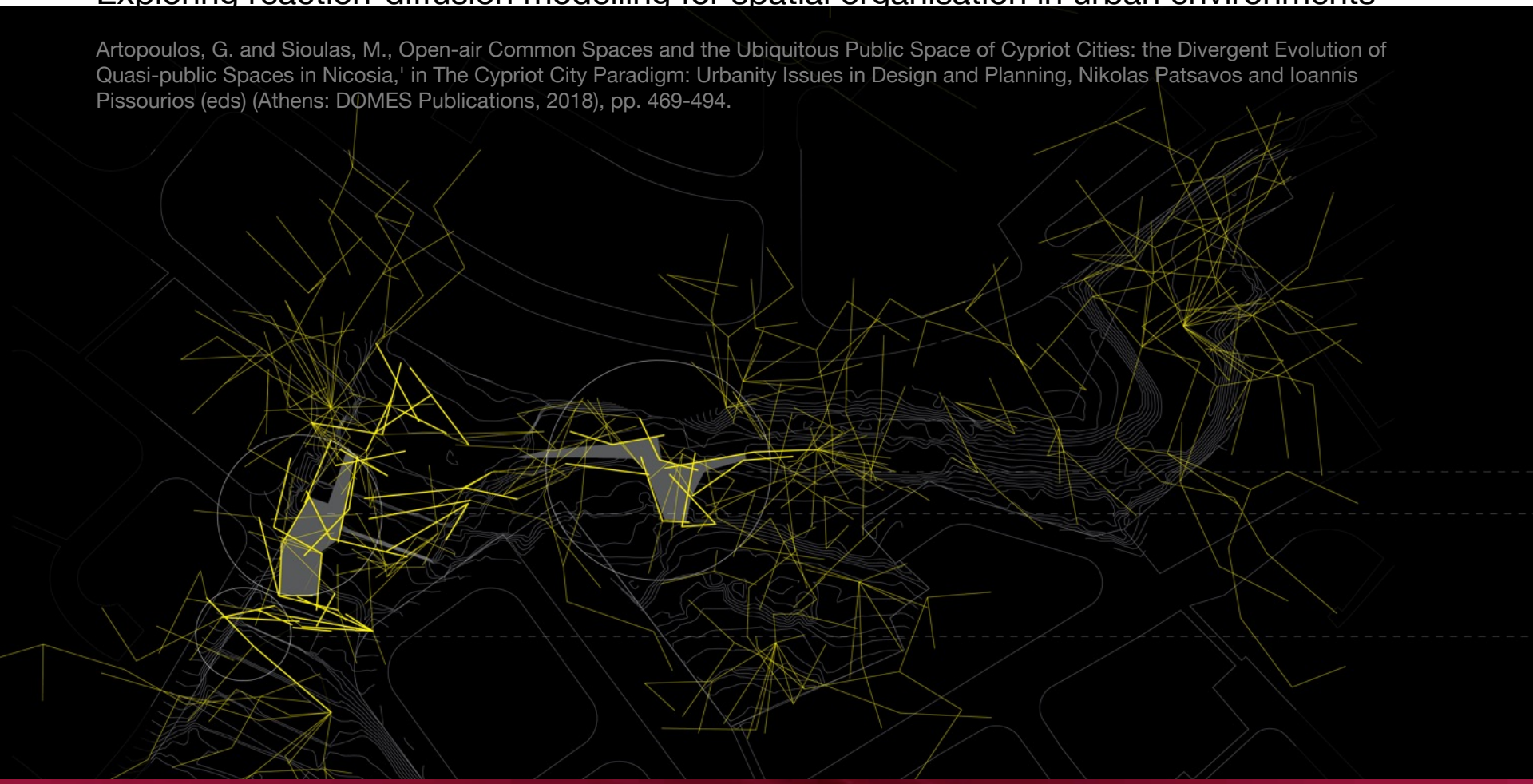
Architectural design: ECONOMOU, Architects & Engineers, Artopoulos Giorgos
with
Metoxis Nikolas, Skantzouris Nestoras
Engineering Consulting: Ktori Zaharias, SEISMIC TECH Landscape design: Grevenaris Giorgos

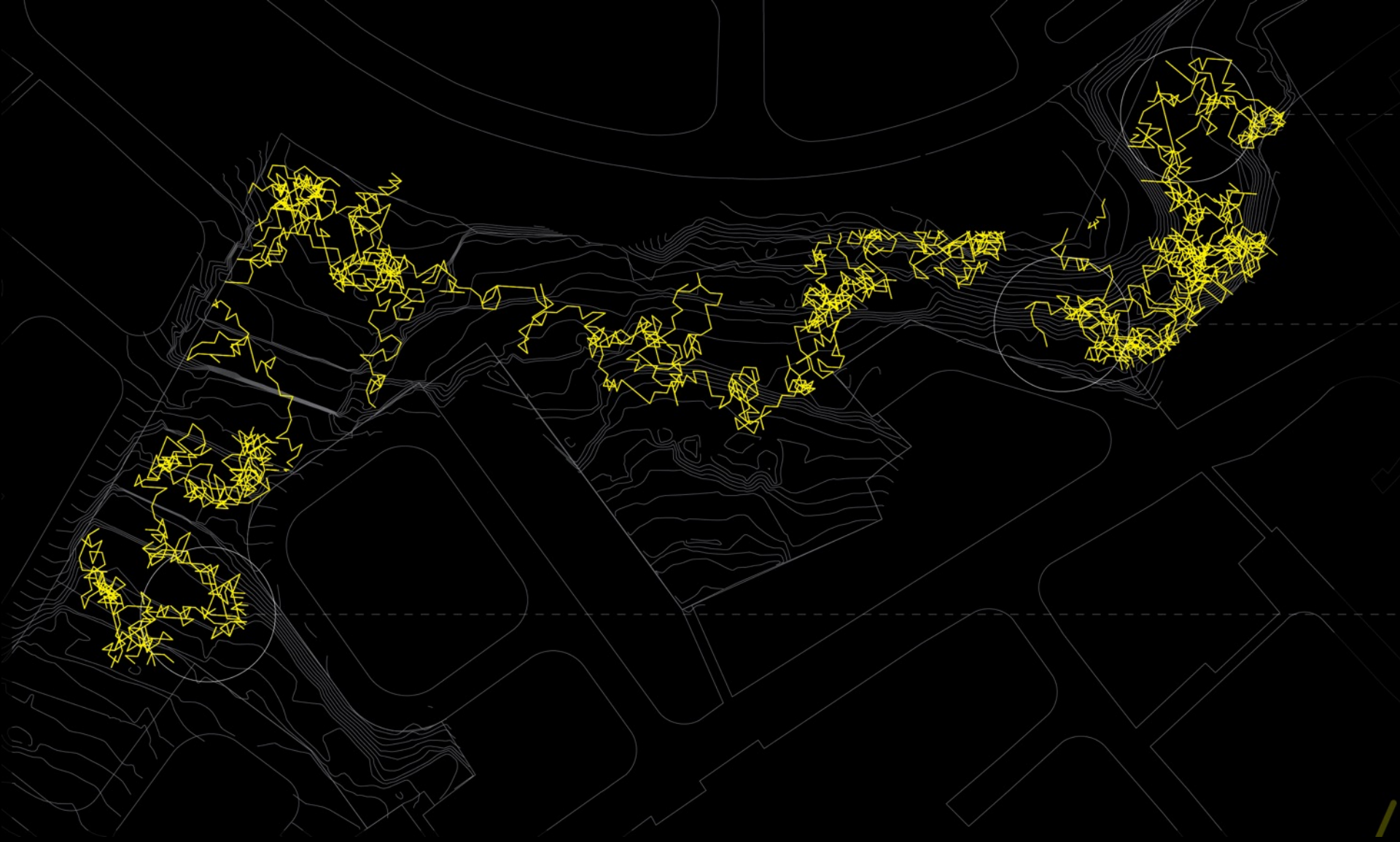
Lighting design: Sevastides Dakis, ARCHTUBE

/ Modelling and simulation: Architecture research on contemporary urban spaces

Exploring reaction-diffusion modelling for spatial organisation in urban environments

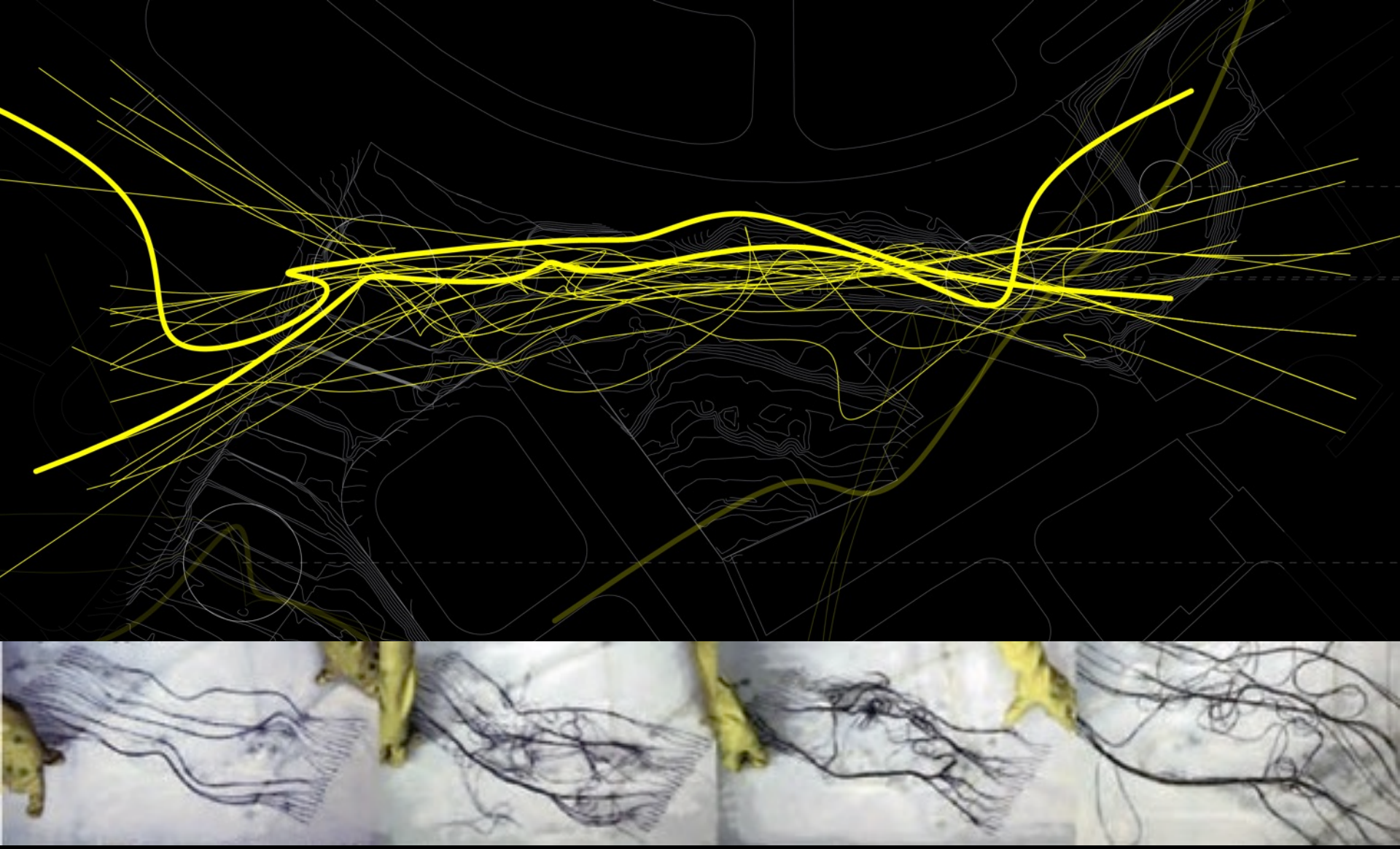
Artopoulos, G. and Sioulas, M., Open-air Common Spaces and the Ubiquitous Public Space of Cypriot Cities: the Divergent Evolution of Quasi-public Spaces in Nicosia,' in The Cypriot City Paradigm: Urbanity Issues in Design and Planning, Nikolas Patsavos and Ioannis Pissourios (eds) (Athens: DOMES Publications, 2018), pp. 469-494.





1. A *RANDOM WALK (*STROLL) IN THE PARK

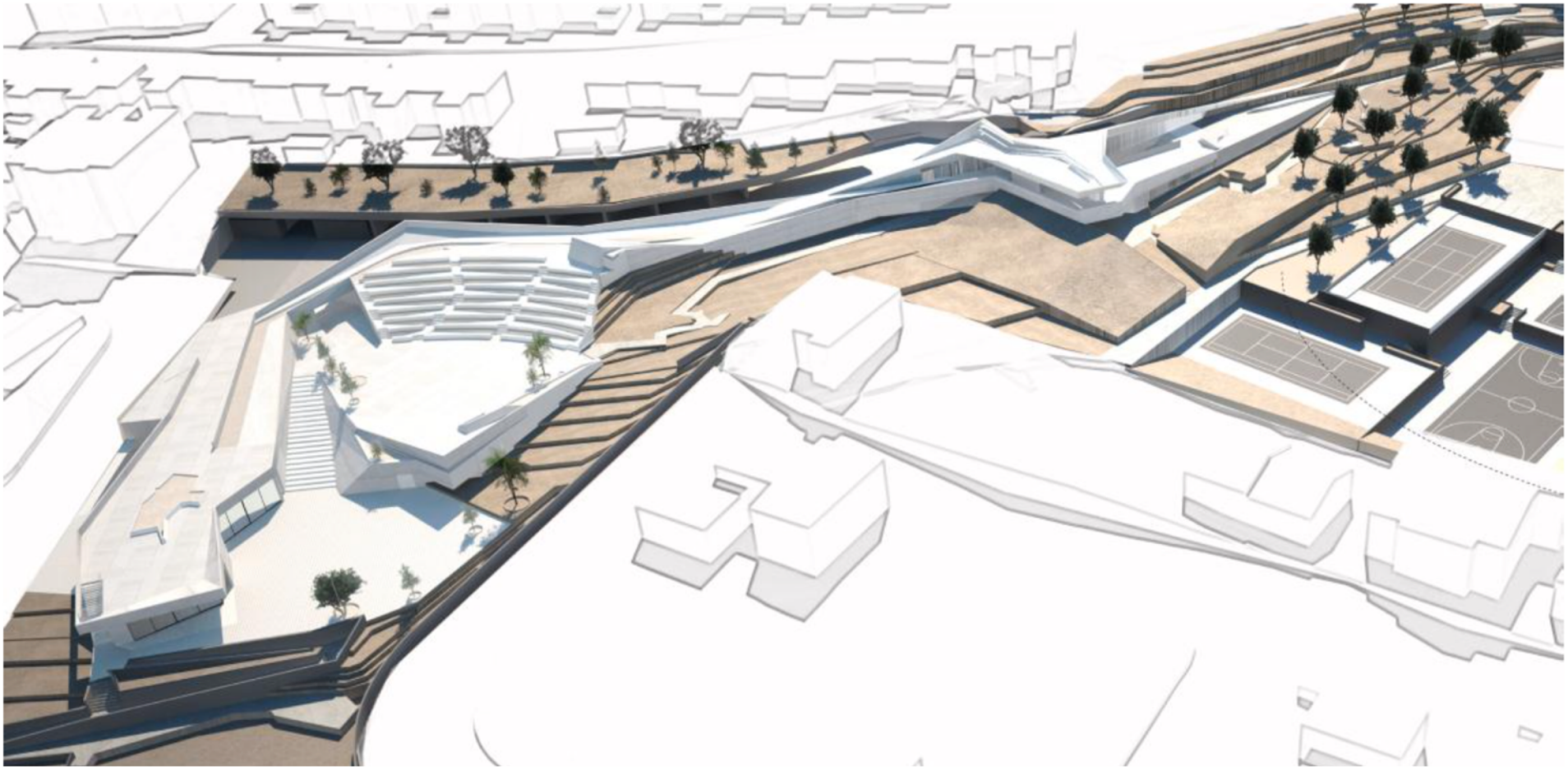
A “random path” digital algorithm was developed (in *McNeel Rhinoceros+Grasshopper*) and applied in the site of our intervention to guide the design of the *slow* route. Attempting to create a walk-scape for the modern-era urban park flaneur, the *slow* route network of paths covers the whole site of the park and aspires to become inseparable part of the educational visit to the Centre. The algorithm generated random paths around specific points of interest selected by us and inserted into the design environment of the computer programs based on our idea for the three stopping areas dedicated to learning about the local natural ecosystem and studying the morphology of the ground.



2. DIRECT / FAST MOVEMENT

A “dynamic threads” digital algorithm was developed (in *McNeel Rhinoceros+Grasshopper*) and applied in the site of our intervention to guide the design of the *fast* route that connects the entries and the parking spaces to the buildings. This algorithm simulates the behaviour of wool threads immersed in colloid fluid, which are self-reorganized as the water evaporates. The wool threads are reconfigured, and as they do so new networks and connectivity emerge out of the interacting system of threads and fluids due to colloid osmotic pressure.

/ Modelling and simulation: Architecture research on contemporary urban spaces



/ Modelling and simulation in:

. Archaeological research on historic sites

. Architecture research on contemporary (historic) urban spaces

/ Modelling and simulation for:

. visualisation & spatial reconstruction methods

. crowd simulation in virtual environments

. built environment research, with ABM

. design & planning, with computational & parametric tools

Stop Saying 'Smart Cities'

Digital stardust won't magically make future cities more affordable or resilient.

BRUCE STERLING | FEB 12, 2018 | TECHNOLOGY

However, the cities of the future won't be "smart," or well-engineered, cleverly designed, just, clean, fair, green, sustainable, safe, healthy, affordable, or resilient. They won't have any particularly higher ethical values of liberty, equality, or fraternity, either. The future smart city will be the internet, the mobile cloud, and a lot of weird paste-on gadgetry, deployed by City Hall, mostly for the sake of making towns more attractive to capital.

Urban space

In a smart city, the citizen, from agent turns into a consumer / passive user: choosing menu options rather than creating the menu!

Should the city be an optimised panopticon, or a melting pot of cultures and ideas?

The two approaches, the “techno-sustainability” and “social sustainability”, are complementary rather than antagonistic in the quest for the holistic development of the city.

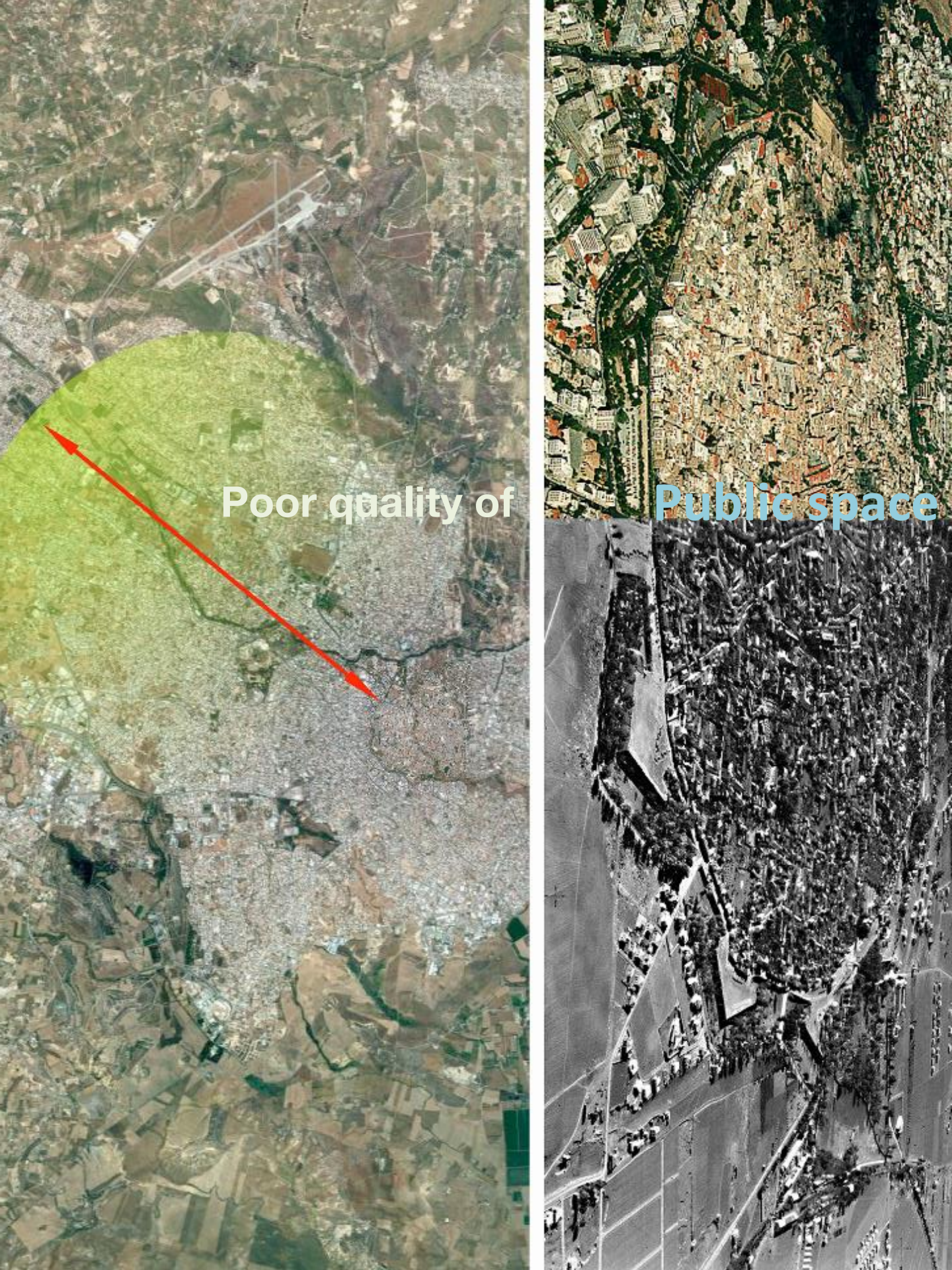
What is the kind of data & access to commons that do matter?

Cities that improve the quality of life for their citizens find themselves more advanced in terms of their sustainability. Such cities strive towards social equity by providing access to **urban commons** and public goods, preventing private appropriation and expanding the scope for improved quality of life for all.

Muslim immigrants pray during Eid al-Adha in front of the University of Athens (2010).

TOLERANCE / PERMISSIVENESS **Public space**

Pilot city in Mediterranean basin: **NICOSIA**


Poor qaality of
Public space

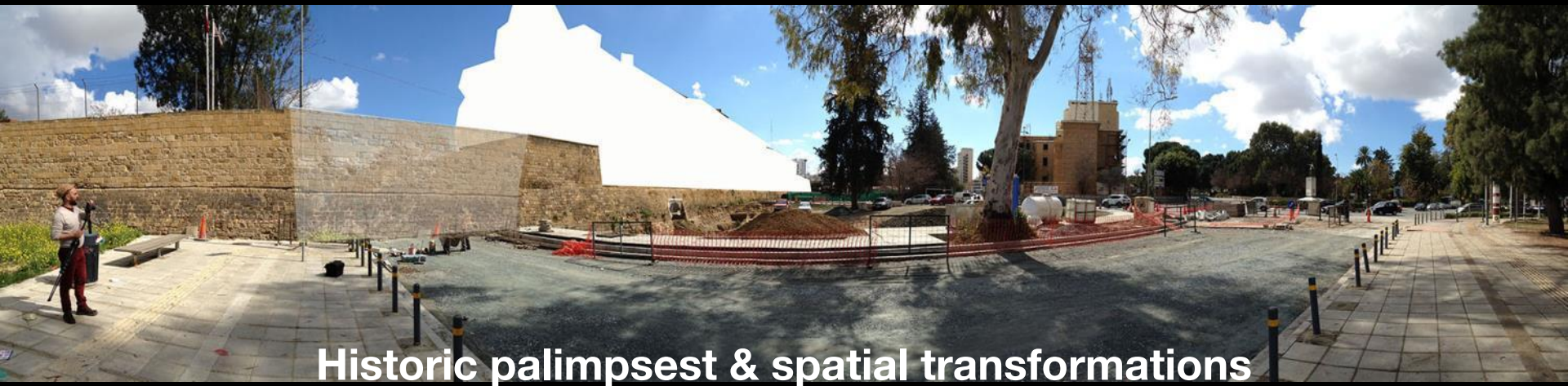
Land use: football fields into the moat


STRAVA / Mapbox

Urban Space as the Matrix of Cultural Identities

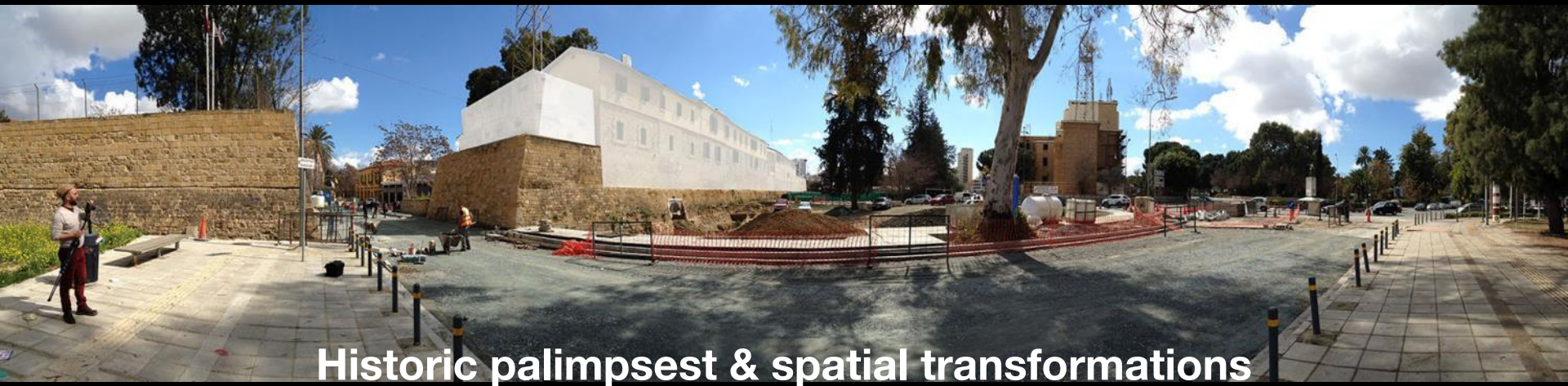
Historic core of Nicosia, 2014

Urban SILENCE (UK), the Cyprus Institute and Wagstaffs Design (UK) were commissioned by the Municipality of Nicosia to develop a 3D interactive platform for the promotion and presentation of newly developed areas of the city along with planned urban regeneration projects (2015).

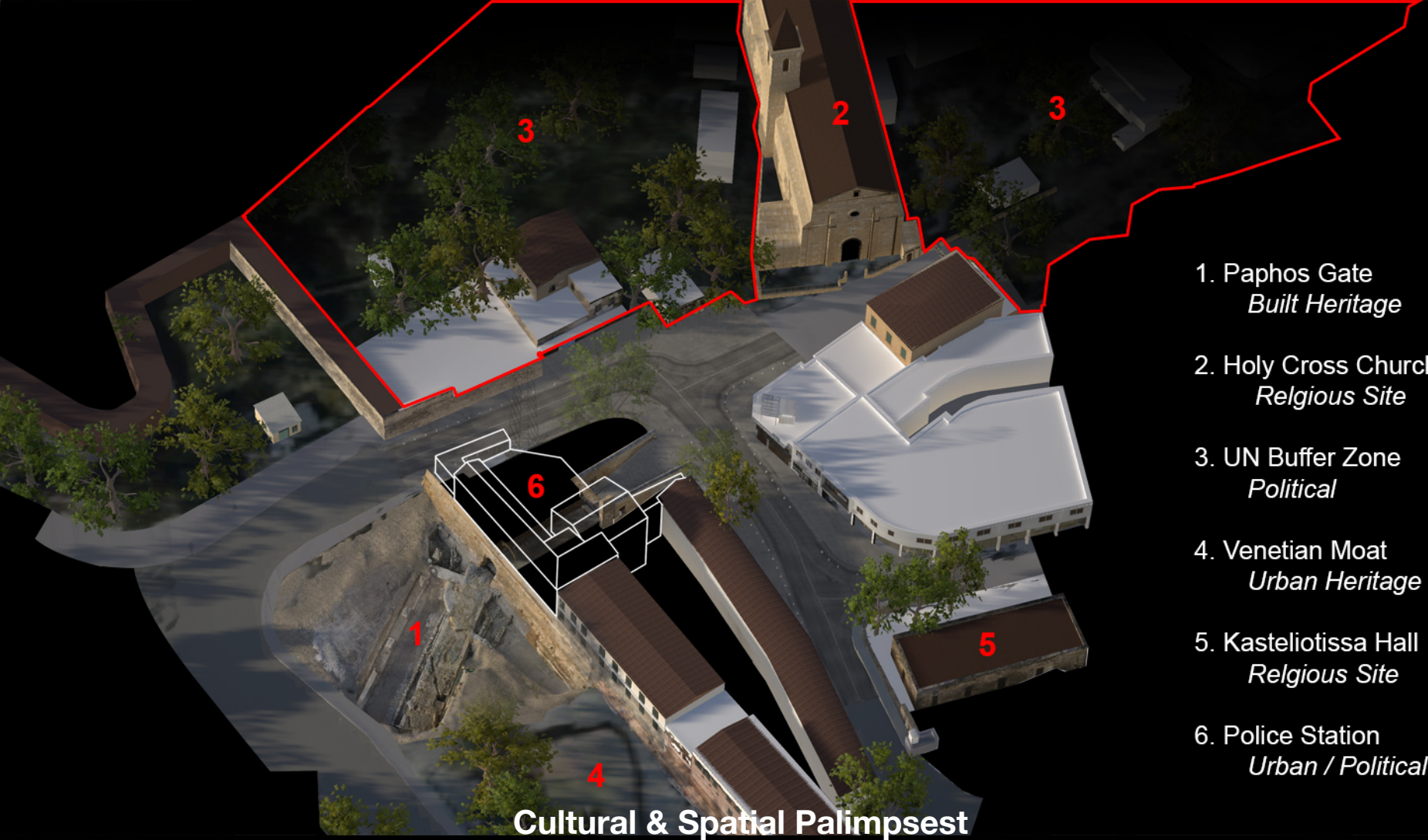


Historic palimpsest & spatial transformations


Historic palimpsest & spatial transformations



Historic palimpsest & spatial transformations

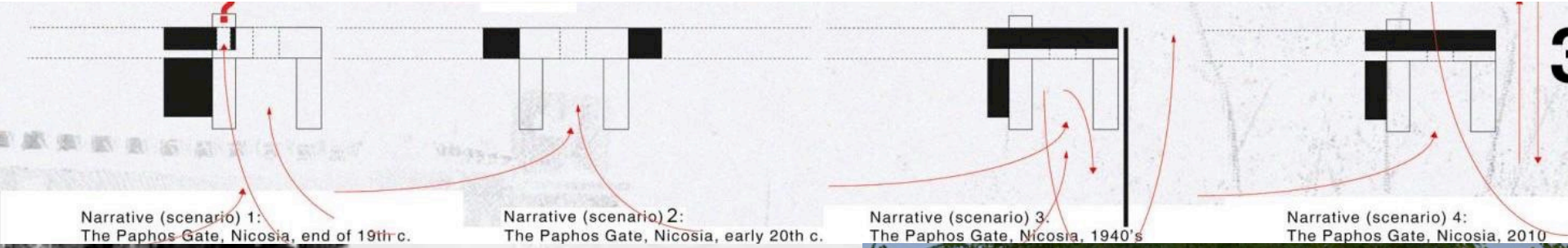


1. Paphos Gate
   Built Heritage
2. Holy Cross Church
   Relgious Site
3. UN Buffer Zone
   Political
4. Venetian Moat
   Urban Heritage
5. Kasteliotissa Hall
   Relgious Site
6. Police Station
   Urban / Political

Cultural & Spatial Palimpsest


Fragmented experiences

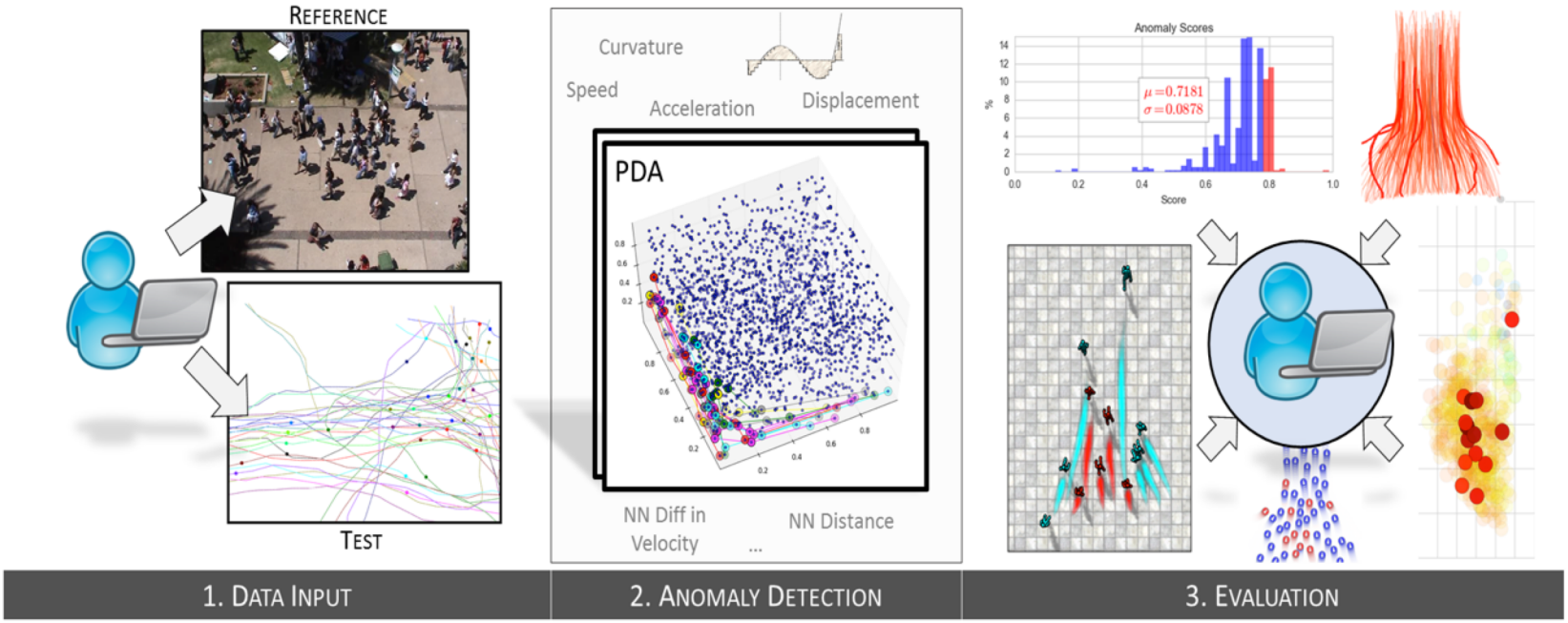

2014
Paphos gate / Nicosia
1951



Paphos Gate, Nicosia, 1951 *(VR) Paphos Gate, Nicosia, 2015*

Spatial Exploration of the historic transformation of urban environment

A Data-Driven Framework for Visual Crowd Analysis



Panayiotis Charalambous, *Ioannis Karamouzas, Stephen J. Guy, A Data-Driven Framework for Visual Crowd Analysis, Computer Graphics Forum (Pacific Graphics), 2014, 33, 7, 41*

The Cyprus Institute

The SIMDAS project has received funding from the European Union ' s Horizon 2020 research and innovation program under the grant agreement No 763558

Simulation & Data Science Center of Excellence

Monday, 30 October, 2017

H2020 COST Action TU1306 Training School

Objective of this training workshop is to discuss about and develop digital interfaces and interactive narratives, which will contribute to the exploitation of heritage in Mediterranean cities for the reactivation of neglected urban green spaces through playful engagement, gamification, and storytelling. Heritage can be used to influence positively the social cohesion of neighborhoods as it could be promoted in such a way that, instead of provoking tensions and division, would offer spaces of inclusion, interesting everyday experiences and provide a sense of belonging to socially excluded communities.

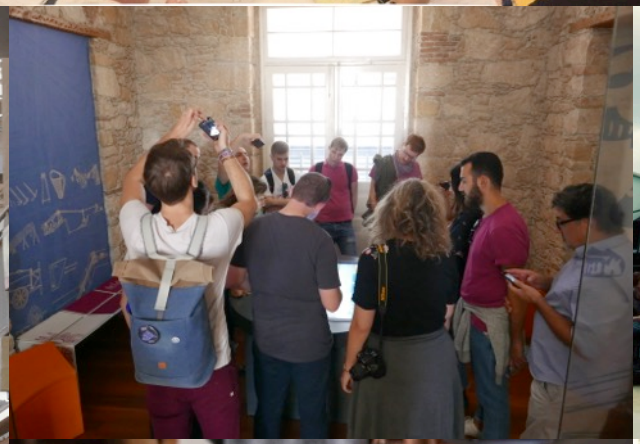
Read More

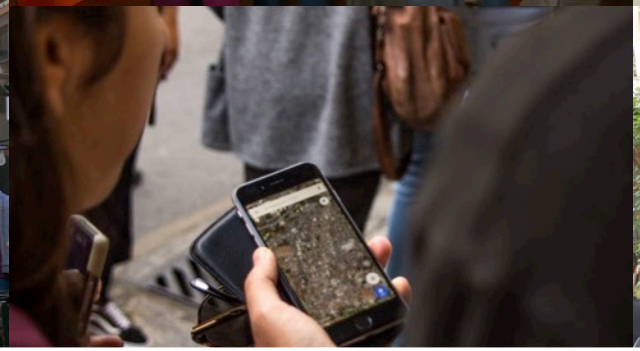
Colloquium: Similarity Assessment for the Study of Artefacts in Cultural Heritage: the GRAVITATE Example

Colloquium: Innovation & Entrepreneurship: From Planning to Doing?

Colloqui... Archaeo... Geophy...
Colloqui... Similarity Assess...
H2020 COST Action...
Colloqui... Innovation &...

14 Oct. 16 Oct. 18 Oct. 20 Oct. 22 Oct. 24 Oct. 26 Oct. 28 Oct. 30 Nov. 2 Nov. 4 Nov. 6 Nov. 8 Nov. 10 Nov. 12 Nov. 14 Nov. 16 Nov. 18 Nov. 20 Nov. 22 Nov. 24 Nov. 26 Nov. 28
Nov.
Timeline JS





The Cyprus Institute

Simulation & Data Science Center of Excellence

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COST is supported by the EU Framework Programme for Research and Innovation Horizon 2020

Maria Kikidou is at **The Cyprus Institute.**

Friday at 19:21 · Nicosia ·

looking to the future
#cyberparks #ar #nicosia
photo by George Artopoulos

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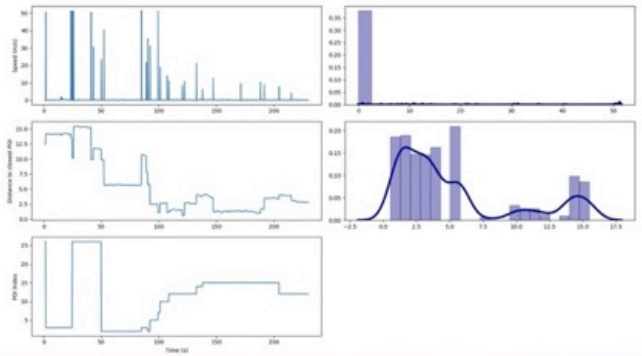
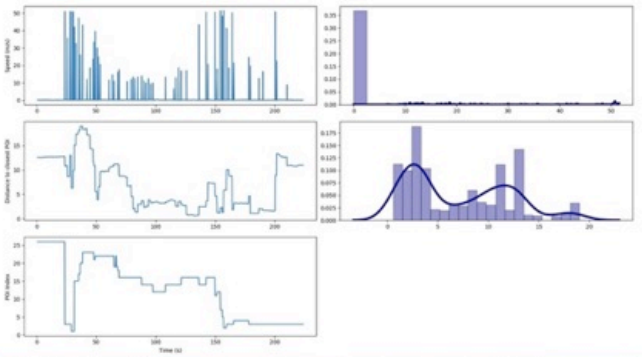
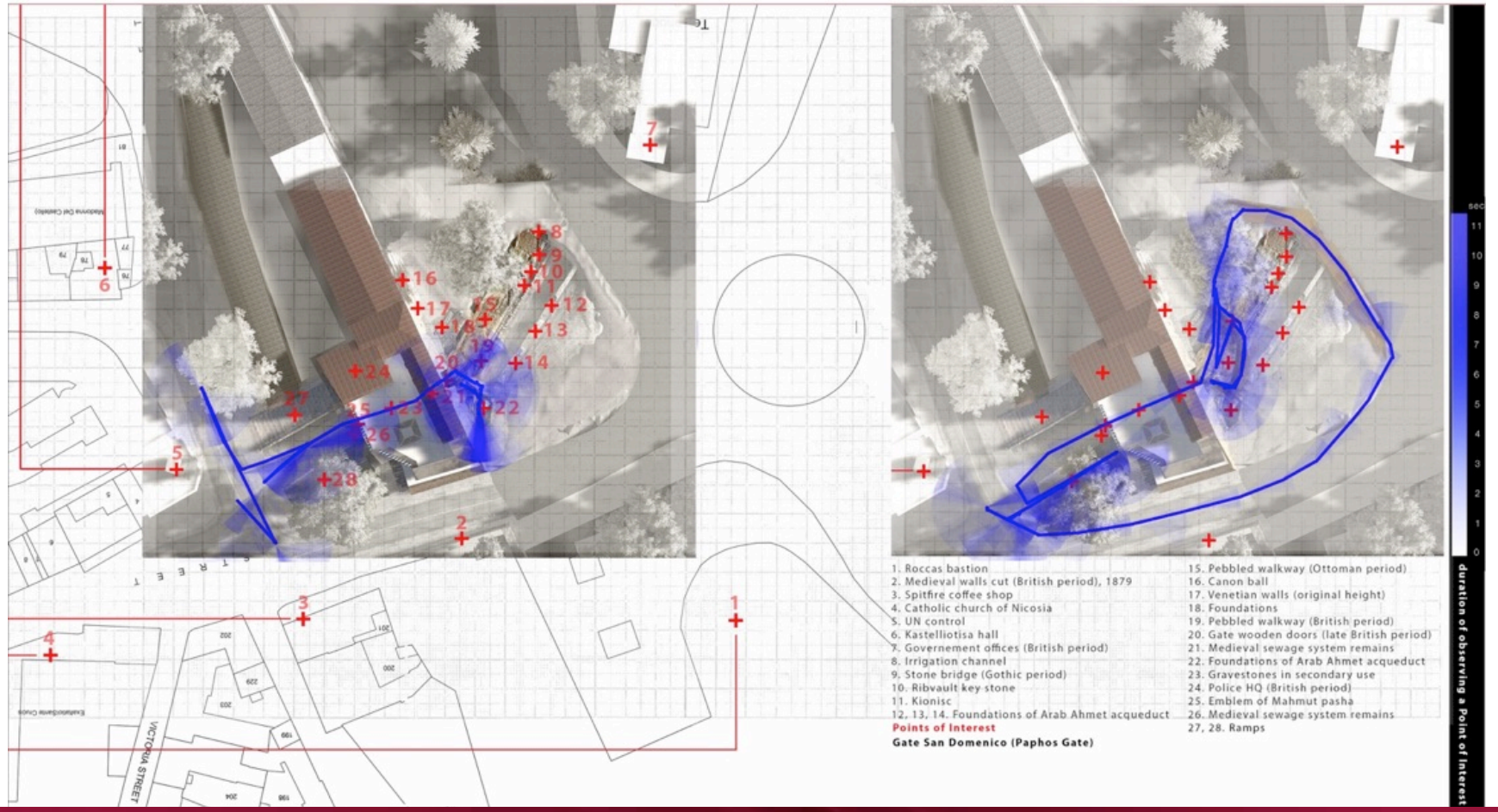
COST is supported by the EU Framework Programme for Research and Innovation Horizon 2020

/ Participatory Methods of Virtual Design /
Engaging with History and Management of POS in the city






1. Roccas bastion
2. Medieval walls cut (British period), 1879
3. Spitfire coffee shop
4. Catholic church of Nicosia
5. UN control
6. Kastelliotisa hall
7. Governement offices (British period)
8. Irrigation channel
9. Stone bridge (Gothic period)
10. Ribvault key stone
11. Kionisc
12, 13, 14. Foundations of Arab Ahmet acqueduct
Points of Interest
Gate San Domenico (Paphos Gate)
15. Pebbled walkway (Ottoman period)
16. Canon ball
17. Venetian walls (original height)
18. Foundations
19. Pebbled walkway (British period)
20. Gate wooden doors (late British period)
21. Medieval sewage system remains
22. Foundations of Arab Ahmet acqueduct
23. Gravestones in secondary use
24. Police HQ (British period)
25. Emblem of Mahmut pasha
26. Medieval sewage system remains
27, 28. Ramps
duration of observing a Point of Interest
sec

In the tests conducted, the gender composition of the respondents was about 57% male and 43% female. The average age was about 35 years, with the youngest user group being 18-24 years old and the oldest between 45-51. The respondents were from 8 countries, higher participation was from Cyprus (6 respondents), and then was Greece, Italy, UK, Portugal, Lithuania, Hungary and Brazil. The majority of the respondents (56% of the sample) hold a PhD, whereas 18% have completed postgraduate studies. Their knowledge base is informed by 8 academic disciplines, ranging from architecture, urban planning and landscape architecture, to information technology, humanities (archaeology and art history) and social science subjects (sociology and economics). Their disciplinary background played a role in the way they read the space. Depending on their expertise, the virtual visitors of the space were expected to focus on different qualities of the modelled space, and interpret differently the historical information that was represented in the space. Half of the participants were local residents (50%) while the rest were foreigners, and this parameter was important as the testing required that participants should memorise and recall specific historical content that was spatially distributed. Half of them visit or pass-by heritage sites in their everyday route from home to work. 37% consider these sites as major attractions of the city, while 18% live nearby historic sites and monuments. This parameter was significant because the testing aimed at understanding the impact of adding alternative walking paths for circulation through and around the archaeological site. It was therefore important to collect feedback from regular users of the space. Regarding the human-computer interface and the use of the presented technological solutions, 68.7% of participants were not familiar with virtual reality systems, while 81,2% strongly agreed, or agreed, that the “projected space and objects looked real”, and 87.5% “had the impression that they could explore the space easily and convincingly and travel in time”.

Artopoulos, G. and Charalambous P., 'Virtual Environments as a Technological Interface between Built Heritage and the Sustainable Development of the City,' in *International Journal of E-Planning Research* (IJEPR) 2018.

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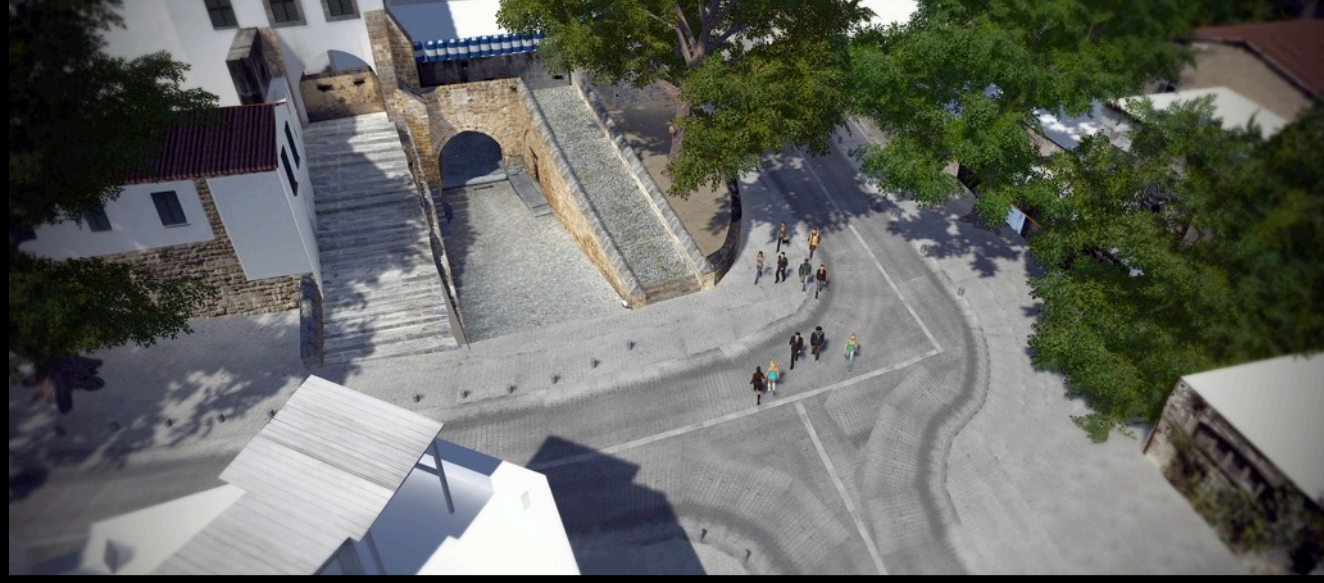
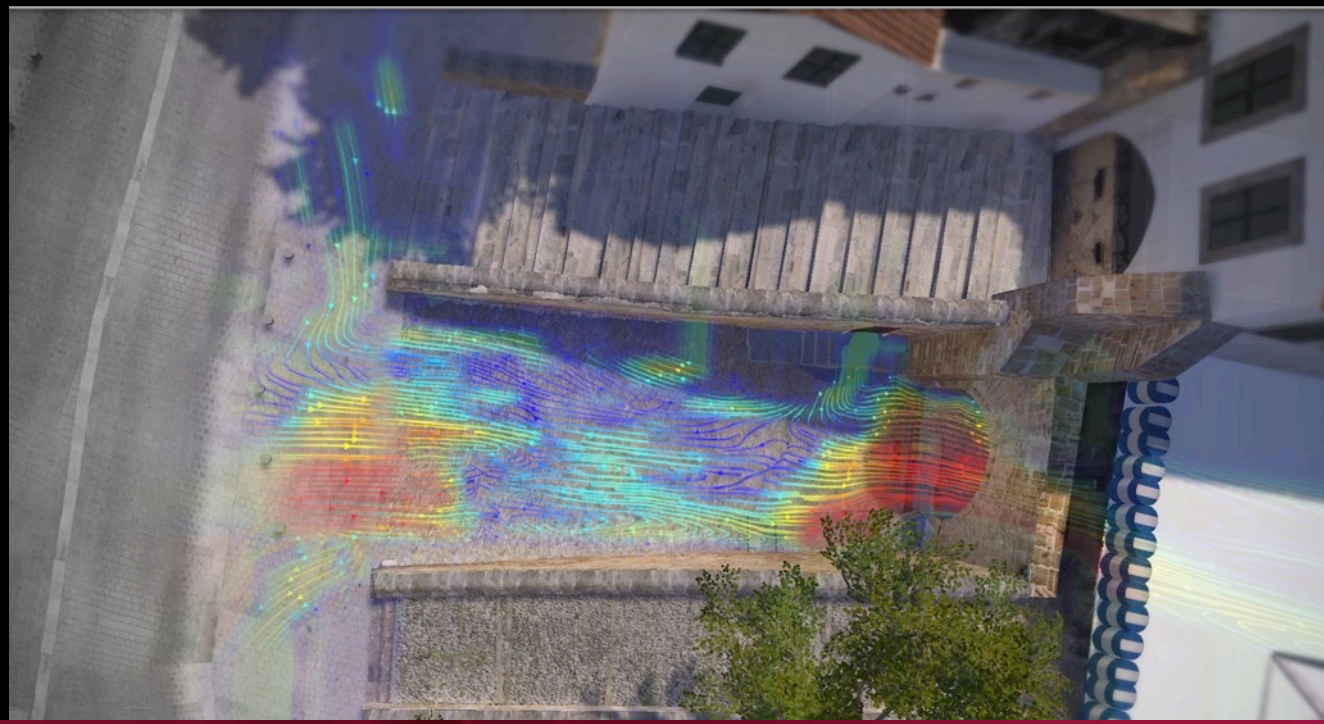


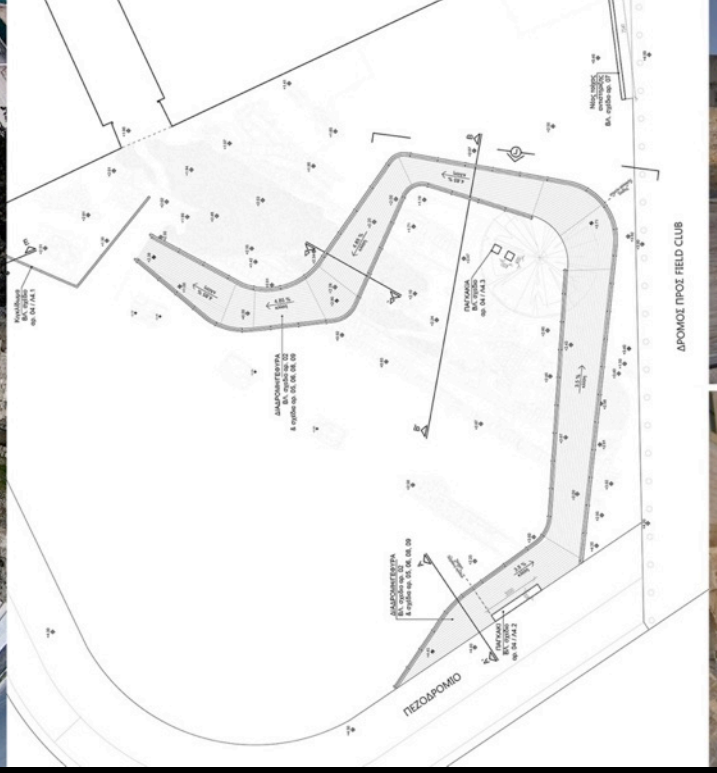


Artopoulos, G., Charalambous P., 'Crowd Simulation for Virtual Environments in Urban Modeling,' in F. Angelucci (Ed), *Smartness e Healthiness per la transizione verso la resilienza. Orizzonti di ricerca interdisciplinare sulla città e il territorio,* BETHA – Built Environment Technologies and Healthy Architectures Series, Architettura e Innovazione, 86.1.4 (IT: FrancoAngeli Publisher, 2018), pp.289-306.

Simulation & Data Science Center of Excellence

The SIMDAS project has received funding from the European Union ' s Horizon 2020 research and innovation program under the grant agreement No 763558

STARC



Client: Cyprus Department of Antiquities
Architects: Artopoulos, G. and *Economou Architects&Engineers*
Structural Eng.: V. Varnava
Lighting Design: ArchTUBE
Budget: €100.000
Date: 2019

United Nations A/HRC/34/56/Add.1

General Assembly

Distr.: General
3 March 2017

Original: English

Human Rights Council
Thirty-fourth session
27 February-24 March 2017
Agenda item 3
Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development

Report of the Special Rapporteur in the field of cultural rights on her mission to Cyprus*

70. Across the island, there is a lack of consultation regarding the meaning of sites, their restoration and future use. That is to be contrasted with the laudable efforts of some civil society groups, such as the Cyprus Institute, which tries to engender what it calls "community participation" in processes of regeneration of cultural heritage.

Recognizing the diversity of narratives about and relationships with cultural heritage

Objectives of modelling and simulation, to:

- Record and visualize **real-time generated data of the agents' preferences** and decisions when interacting with spatial data;
- **Enable in-depth analysis** of historic/heritage urban sites, their everyday use and appropriation;
- Highlight the contribution of heritage to the development of **resilient cities.**

This presentation draws from research conducted at the Cyprus Institute (Cyprus) by Georgios Artopoulos and Nikolas Bakirtzis in collaboration with the team of Prof. Donna Cox, AVL, National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign (USA).

Also I would like to acknowledge the close collaboration of the Cyprus Department of Antiquities; in particular its director Dr. Marina Solomidou-Ieronymidou and archaeological officer Polina Christophi, as well as, the support of Agni Petridou and Athina Papadopoulou from the Municipality of Nicosia.