



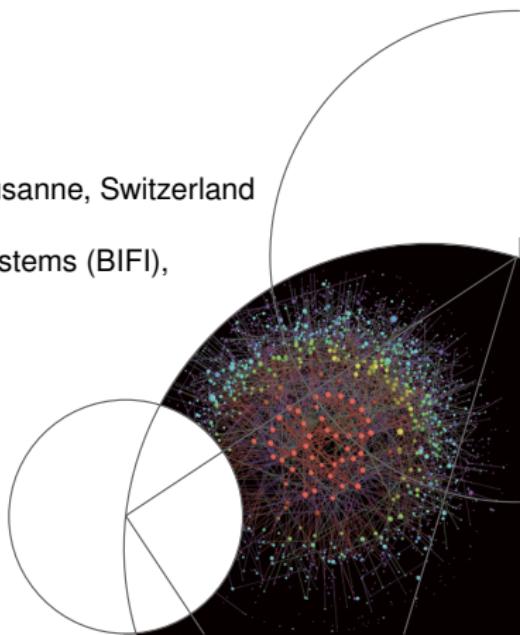
Several multiplexes in the same city: The role of socioeconomic differences in urban mobility

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A moving world



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Current Issue > vol. 106 no. 51 > Duygu Balcan, 21484–21489, doi: 10.1073/pnas.0906910106

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Multiscale mobility networks and the spatial spreading of infectious diseases

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Travellers are not all the same!



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Question:

How the differences in the socio economic status of travellers affect the urban mobility?

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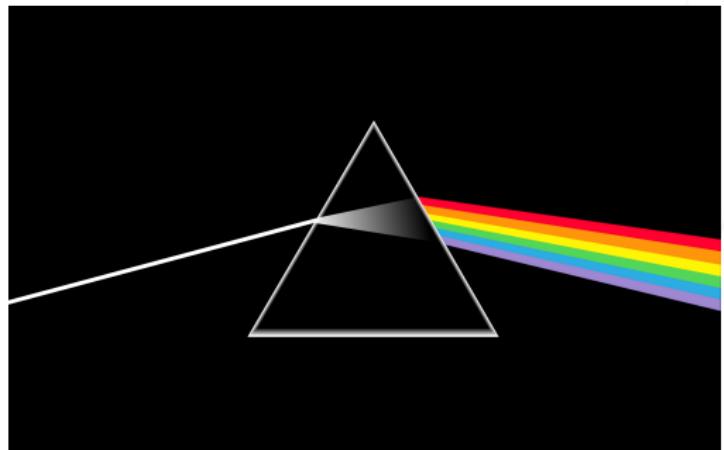
Seeing through complex systems



Complex networks are
like an x-ray lens
for complex systems.

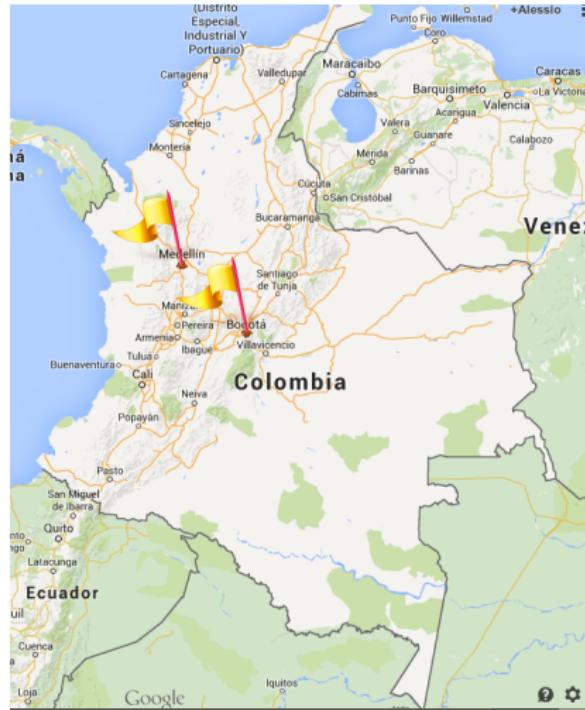
Seeing through complex systems

Multiplex networks are
like an x-ray prism!



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Datasets

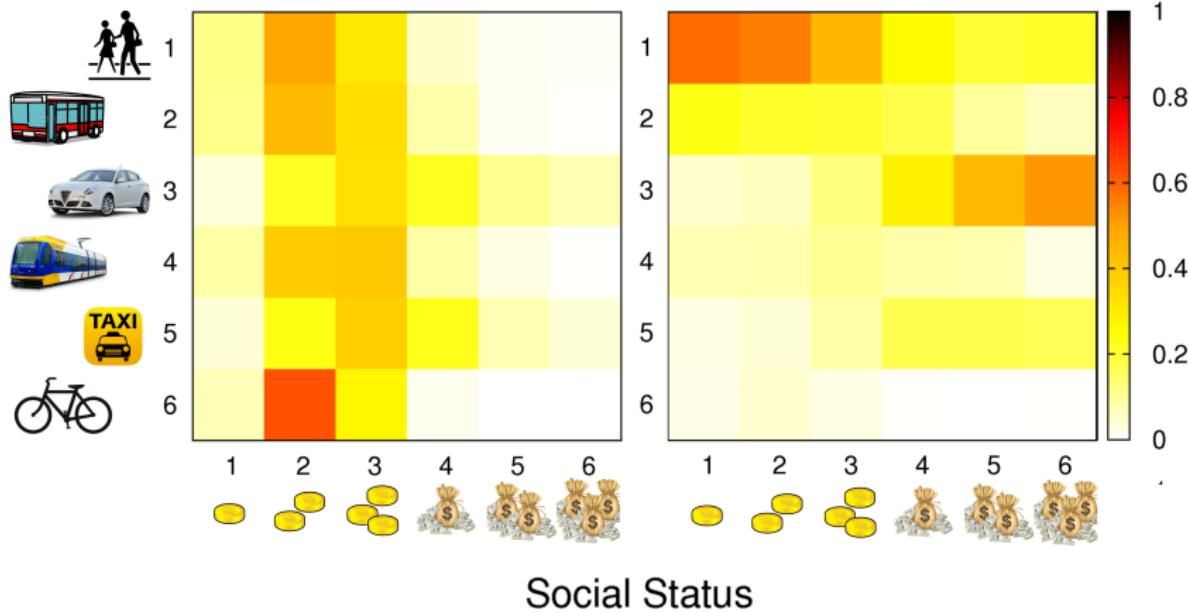


Main features:

- Two Colombian cities: Bogotá and Medellín.
- Population divided in six Socio Economic Status (SES).
- Transport modes grouped into six different classes (layers).

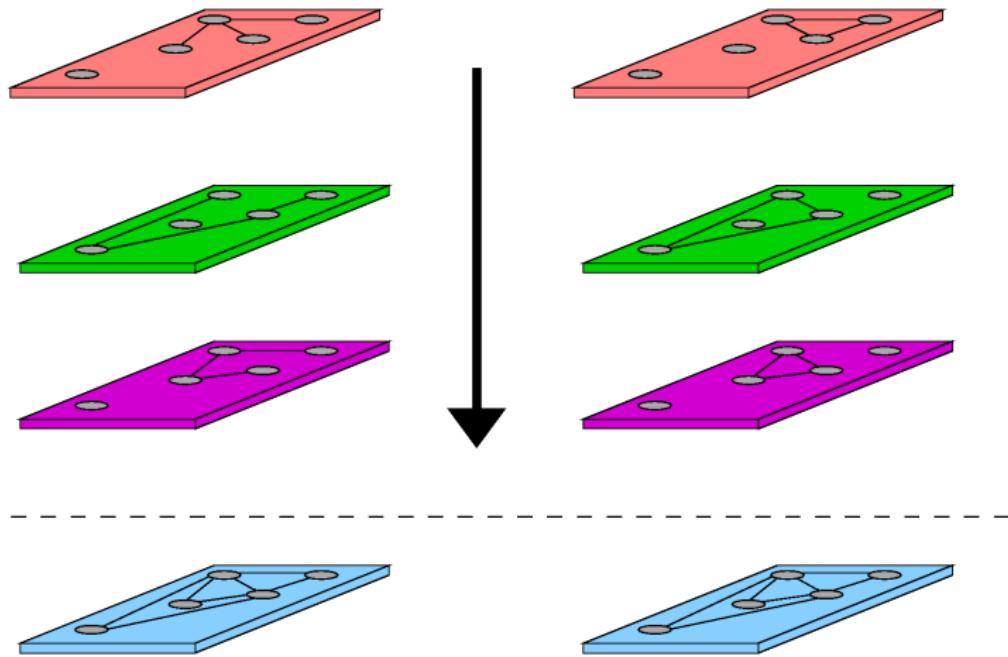
Segregation and Multimodality

Transportation Mode



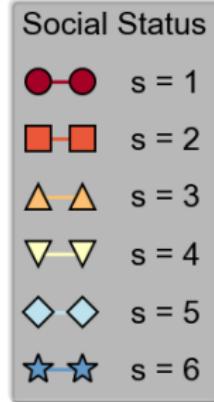
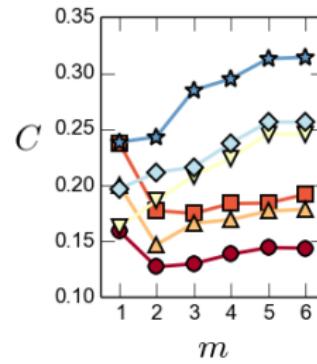
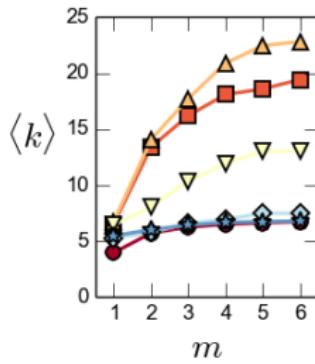
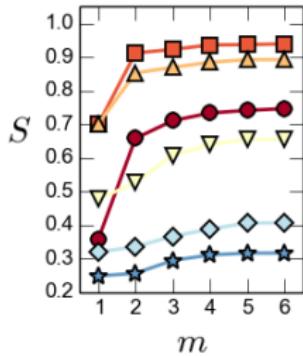
Social Status

Multiplex adiabatic projection



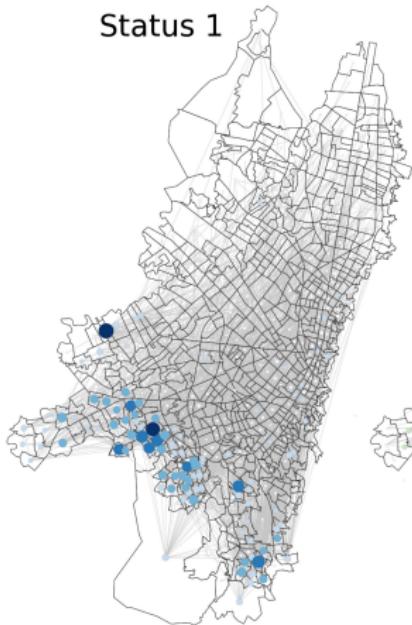
AC et al. "Emergence of network features from multiplexity". Sci. Rep., **3**, 1344. (2013).

Percolation & Connectivity



Percolation & Connectivity

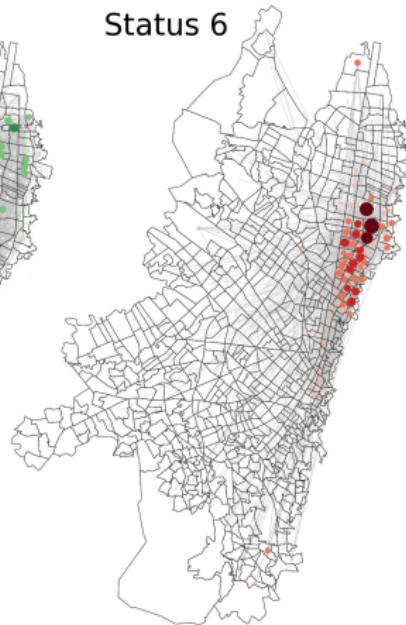
Status 1



Status 3

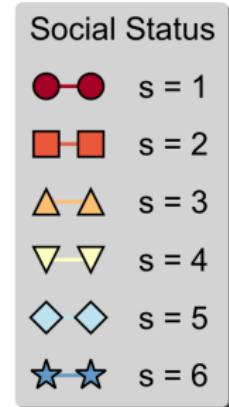
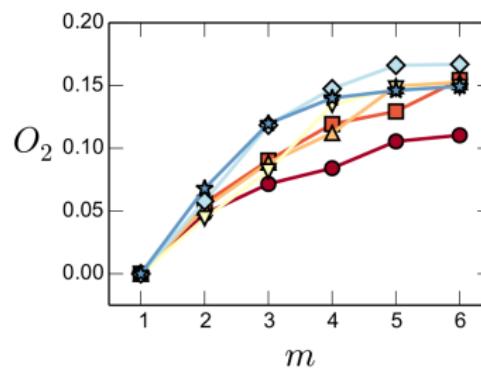
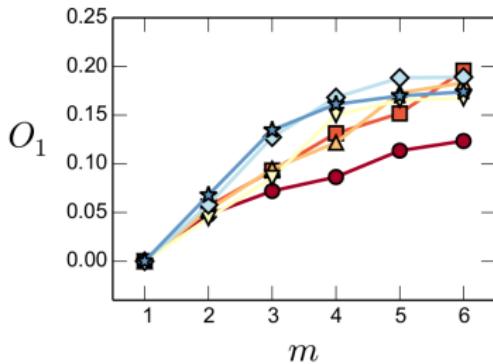


Status 6



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Overlap



$$O_1 = \frac{W - K}{K}$$

$$O_2 = \frac{D}{K}$$

Take home messages

- Differences in the wealth status of travellers reflect on the topological properties of mobility networks.
- Some social status use only few transportation modes (**segregation**) while others display **multimodality**.
- The adiabatic projection technique as a tool to understand the relation between mobility and topological properties.



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<http://arxiv.org/abs/1408.2484>

To appear in the book "Interconnected Networks",
Springer complexity series (2015).

