Dynamics of Sensor vs. Target

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Representation of Spatial Dynamics

• Two established ways to represent motion: the Lagrangian vs. Eulerian view of motion.

In the Lagrangian view, the focus is on an object, while the background frame moves.

In the Eulerian view, the focus is on a fixed frame, while objects move within the frame.
Lagrangian vs. Eulerian View of Motion

In the context of disease dispersion

• The individual-centric network model is most analogous to the Lagrangian view. The individual node is the focus, while the background changes.

• The model is best suited for estimating individualized health vulnerability and outcome. This model model is dominant in health studies.
Lagrangian vs. Eulerian View ..

- The location-centric network model is most similar to the Eulerian view. The network is fixed in space, the infection flows in the network.

- This model is most effective in representing the spatial-temporal dynamics of an epidemic in an network-formed environment
  - location, time, spatial-temporal pathways, distance, speed, direction, extent of disease flow, among many.
Spatial-temporal disease flow pathways (Zhong and Bian, 2016)
Dynamic Sensor vs. Dynamic Targets

- Both sensors and targets can be dynamic.
  Static sensors, mobile targets
  Mobile sensors, static targets
  etc.
# Dynamic Sensors and Targets

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<th>Mobility</th>
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Relevance

• One project has 14 millions cell phone data entries. Another has 4 millions Wi-Fi data entries, and much more are coming.

• These data are collected from different perspectives.

• It does take clear conceptual thinking before the data can be used.