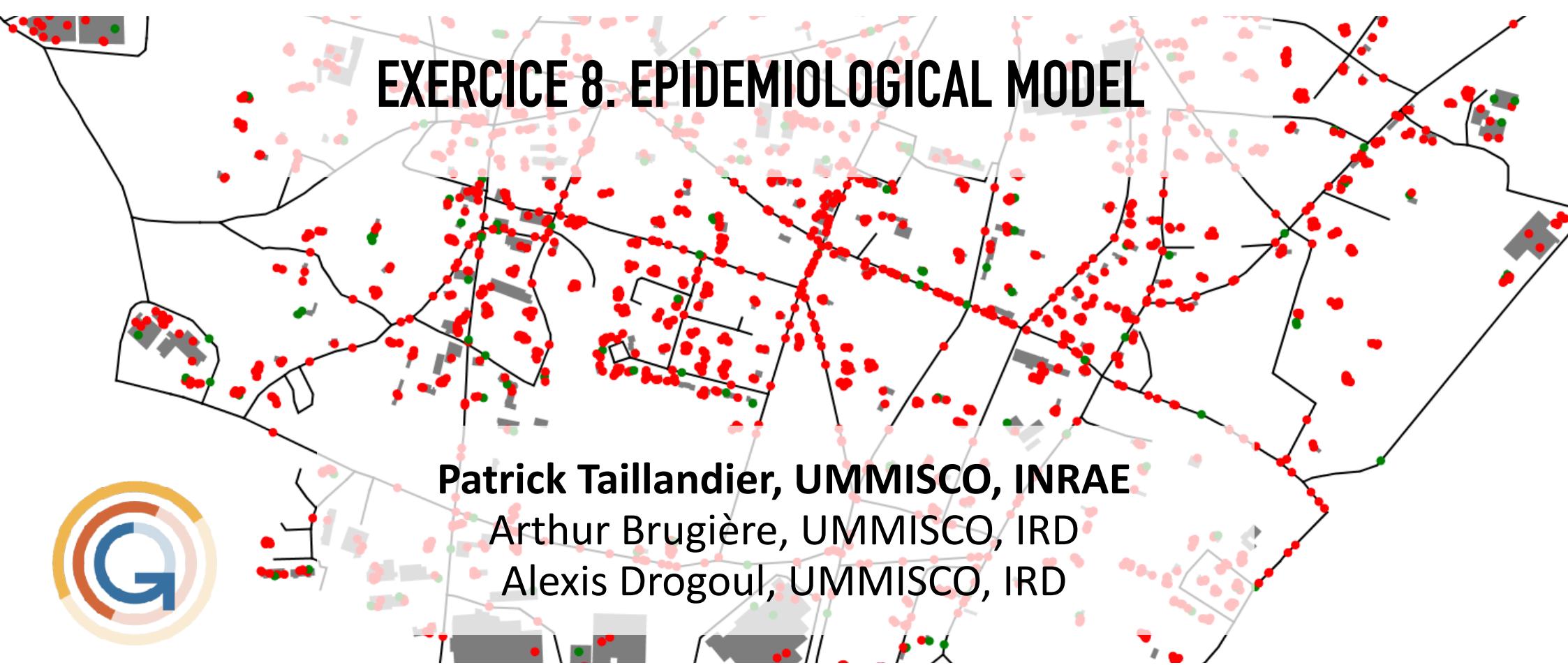


# EXERCICE 8. EPIDEMIOLOGICAL MODEL



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Alexis Drogoul, UMMISCO, IRD



# EXERCICE 8. Epidemiological model

The model built concerns the flu spreading in the city of Luneray (Normandie, France).



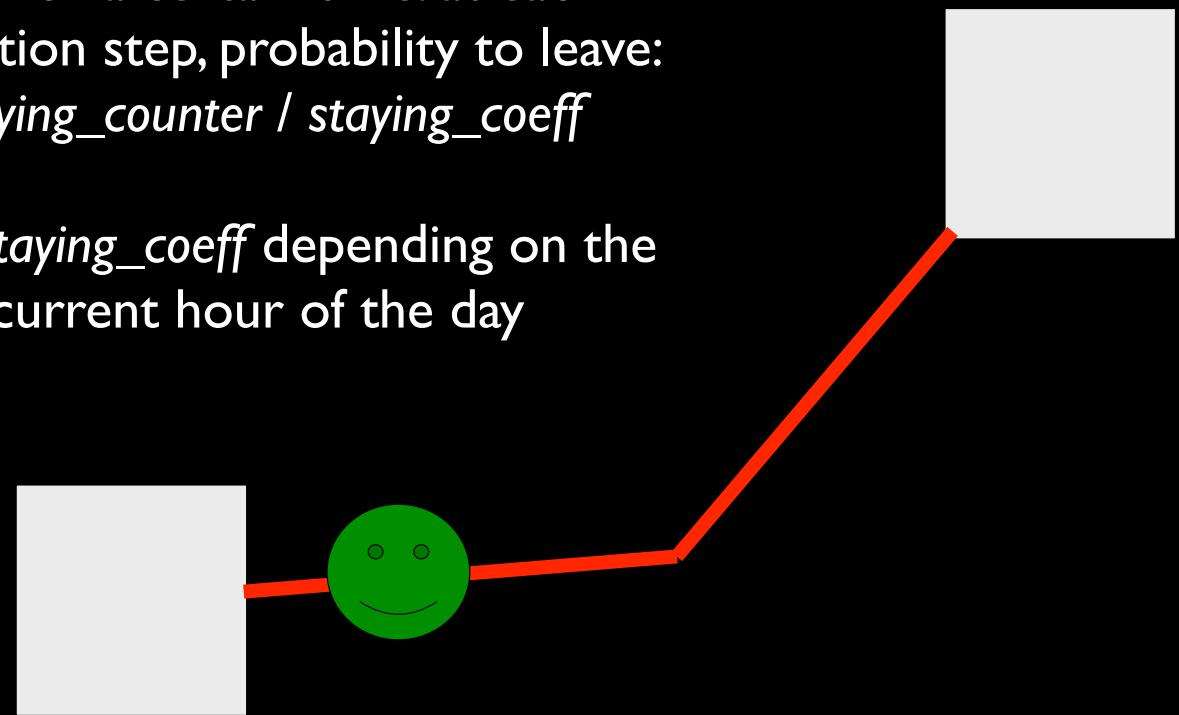
# EXERCICE 8. Epidemiological model

Moving dynamic



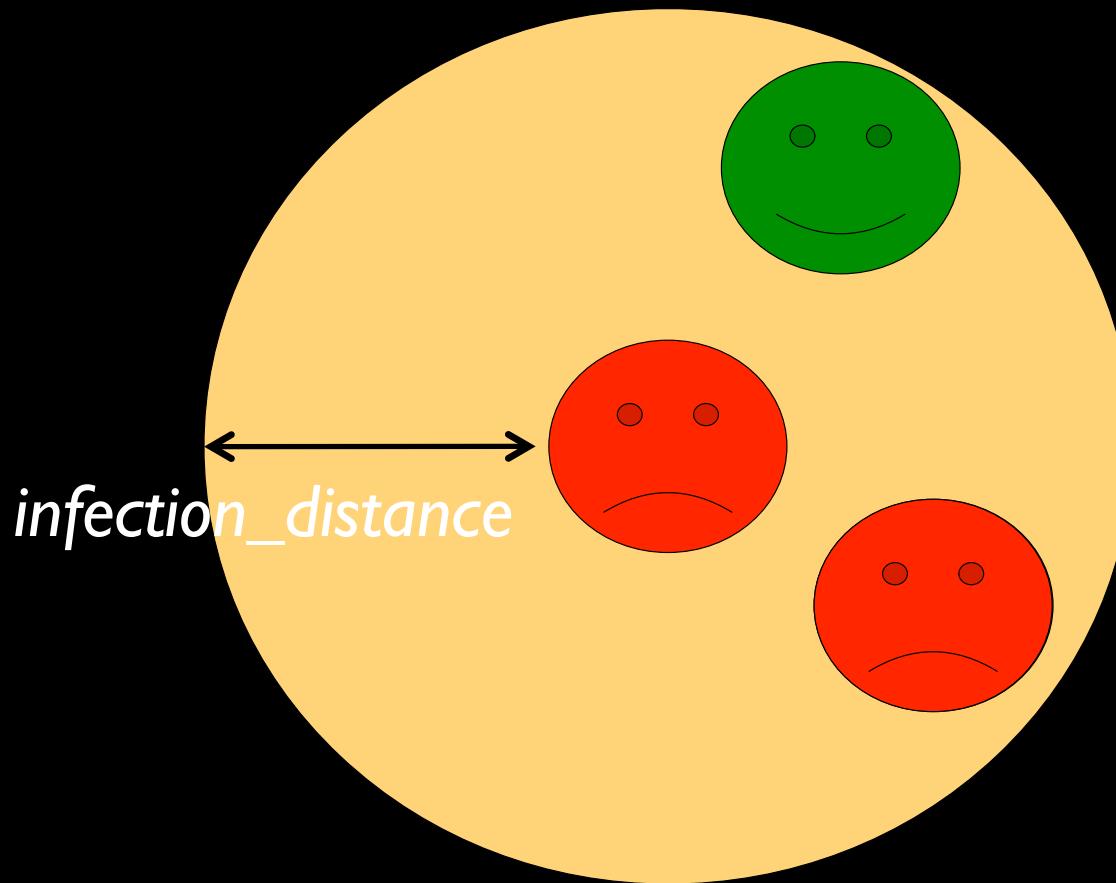
Stay for a certain time: at each simulation step, probability to leave:  
*staying\_counter / staying\_coeff*

with *staying\_coeff* depending on the current hour of the day



# EXERCICE 8. Epidemiological model

Infection dynamic

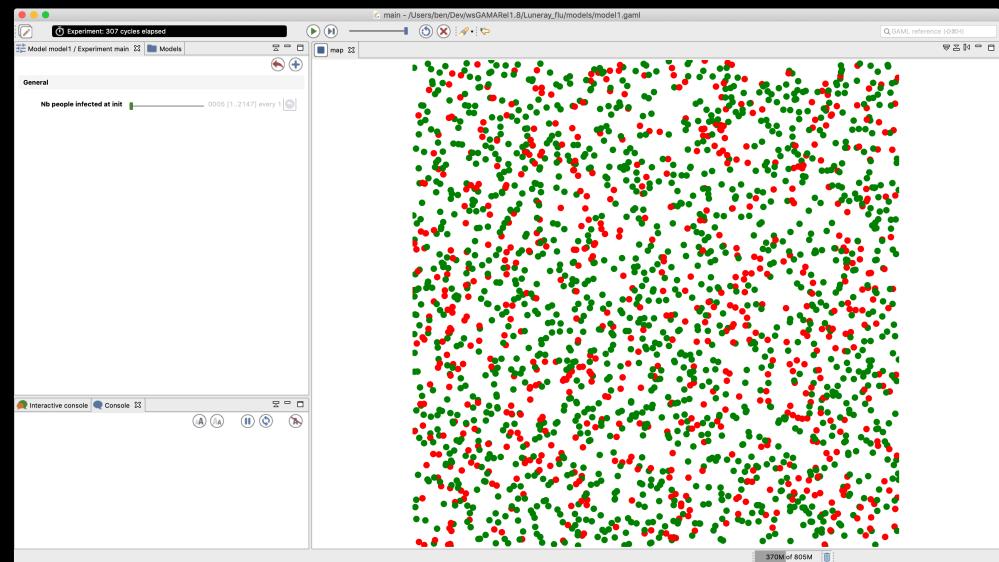


For each not infected people, probability to be infected:  
 $\text{proba\_infection}$

# EXERCICE 8. Epidemiological model

## STEP 1 : basic model

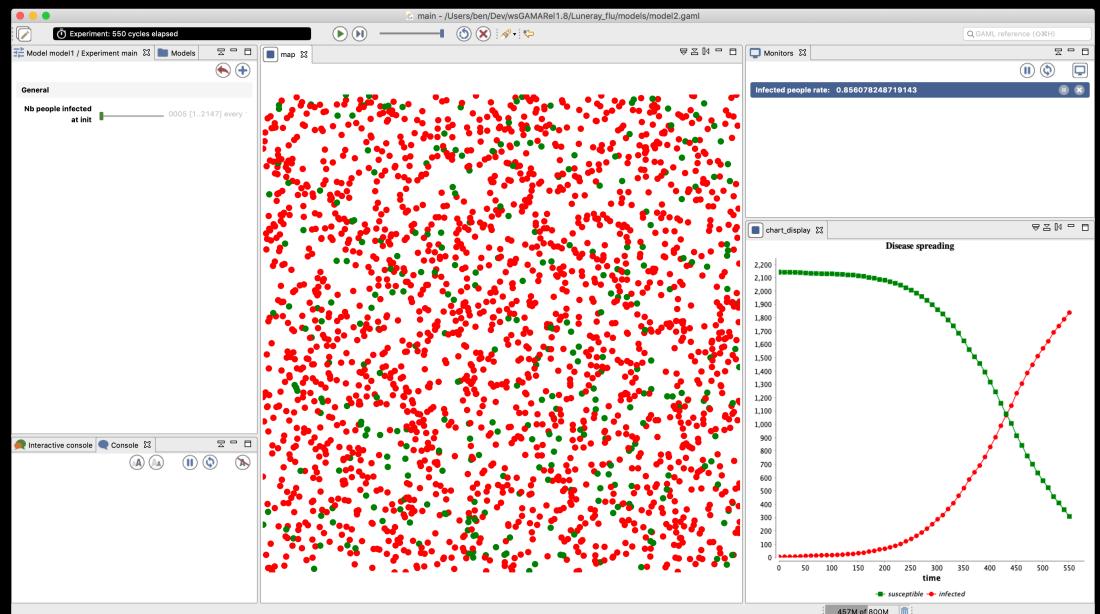
1. Set the time duration of a time step to 5 minutes
2. Define the people species with a moving skill
3. Define the move reflex that allows the people agent to move randomly and the infect reflex that allows them to infect other people agents.
4. Define the aspect of the people species
5. Add the people species to a display
6. Create the people agents



# EXERCICE 8. Epidemiological model

## STEP 2 : add outputs

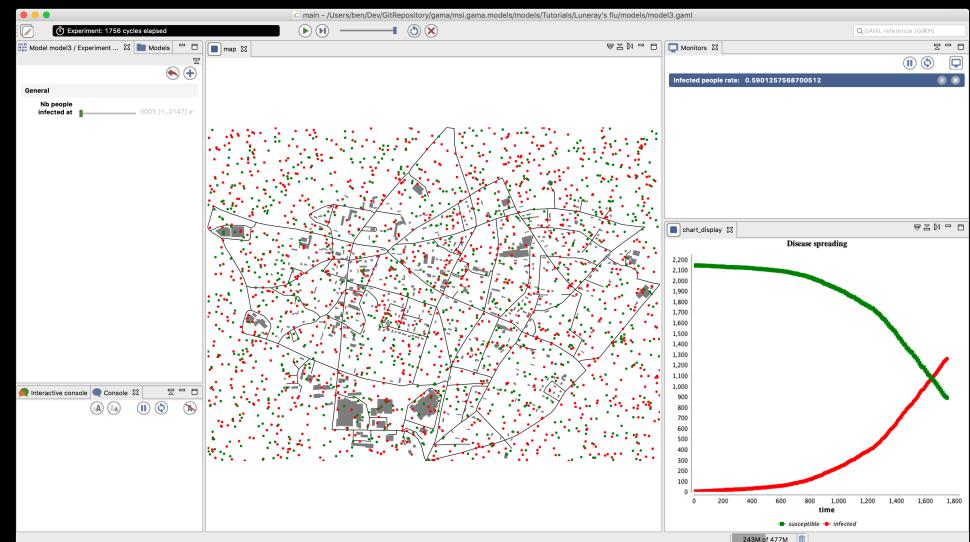
1. Add three new global dynamic variables to follow the evolution of the number of infected people agents, of not infected people agents and of the rate of infected people.
2. Define an ending condition for the simulation
3. Define a monitor to follow the rate of infected people agents
4. Define a chart to follow the rate of infected people agents



# EXERCICE 8. Epidemiological model

## STEP 3 : add GIS data

1. Define 2 new species that will just be displayed:  
road and building.
2. Define new global attributes to load GIS data  
(shapefile).
3. Use the GIS data to create the road and  
building agents.
4. Add the road and building agents to the display.



# EXERCICE 8. Epidemiological model

## STEP 4 : Add a graph to constraint people movement

1. Define a new global variable: the road network (graph).
2. Build the road network graph from the road agents
3. Add new attribute to the people agents (target)
4. Define a new reflex for people agents: stay.
5. Modify the move reflex of the people agents.

