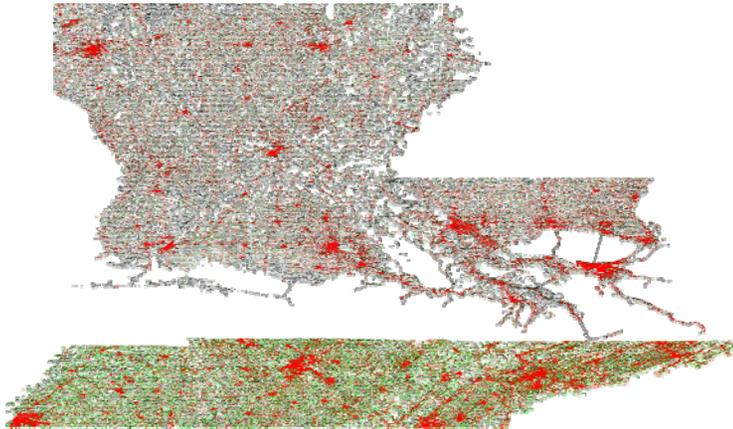


# GARFIELD: Graphical Agents Reacting in a Field

Modeling and Simulation Group



## *Problem Statement:*

Large scale vehicular mobility simulations are characterized by long-range queuing and behavioral effects. Control mechanisms and other dynamic phenomena are highly computationally intensive. GARFIELD is a prototype simulation system that incorporates high detail at large scale, executing real-time simulations of US road networks at the scale of a few states ( $10^6$  intersections,  $10^8$  vehicles).

## *Technical Approach:*

Novel *field-based* formulation is used to exploit GPU computing power. A canonical regular vector field grid scheme is defined, to which any arbitrary road network can be mapped. Road network control is modeled as a spatially distributed field in which vehicles are immersed. Their movements at each node are influenced by the field.

## *Benefit:*

GARFIELD executes simulations in real-time (or faster) on state-sized networks, and enables better insightful analyses and emergency planning through large-scale simulations within short decision time constraints.

