

## Research Assistant / Master's Thesis

### Graph Partitioning for Parallel Agent-based Road Traffic Simulation

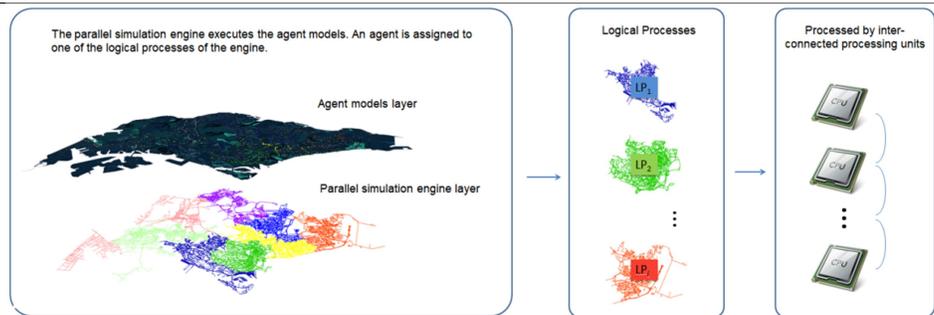
#### Full Time Position at TUMCREATE, Singapore

Availability: Now

Contact: Dr. Yadong Xu (yadong.xu@tum-create.edu.sg)

#### Background

Traffic simulation is still one of the most important tools for evaluating emerging technologies for road transportation. Large-scale microscopic traffic simulation is computationally intensive. Parallel and distributed computing techniques have been used for speeding up traffic simulations. Graph partitioning algorithms have been commonly used to decompose traffic simulations so that they can run on supercomputers.



#### Objective & tasks

The goal of this thesis will be to explore graph partitioning heuristics for parallel agent-based road traffic simulation, with the consideration of modern multi-core HPC architectures. More specifically, the communication overhead among shared memory processes and distributed memory processes is different. Thus, by taking the hardware architecture into consideration, partitioning algorithms can be potentially improved.

Completing the project requires the following steps:

1. Literature review and hand-on experimentation on existing graph partitioning algorithms applied in parallel and distributed computing
2. Identifying the limitations and formal definition of requirements of the new algorithm
3. Designing of the graph partitioning algorithm
4. Carrying out of experiments and evaluating performance
5. Dissertation/paper writing

#### What we expect from you

- Interest in algorithm design
- Knowledge of Algorithms and data structure
- Programming with C++
- Basic Knowledge of parallel and distributed computing
- Basic knowledge of modeling and simulation

#### What we offer you

- An international and multidisciplinary working environment
- Opportunity to work on a project with real-life relevance
- Work with researches from world-renowned Universities (TU Munich and NTU Singapore)

**Send your resume/CV to the contact person if interested NOTE: Only shortlisted candidates will be contacted**

#### ABOUT TUMCREATE

TUMCREATE is a research platform for the improvement of Singapore's public transportation, including the deployment of electric and autonomous mobility. Researchers from Technical University Munich and Nanyang Technological University join forces and are funded by Singapore's National Research Foundation as part of the Campus for Research Excellence And Technological Enterprise (CREATE).

TUMCREATE is made up of over 100 scientists, researchers and engineers led by Professors from the Technical University of Munich and Nanyang Technological University.