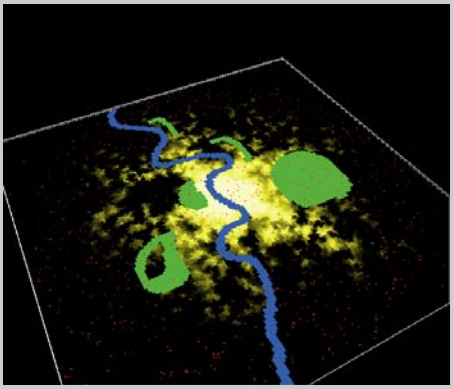
S4-European Modelling Tour/CO-SMA-GEM

Spatial microsimulation of social and environmental processes

Image et Ville, Strasbourg, France

26-27 March 2007



In the joined framework of the S4/CO-SMA-GEM groups activities, the Image et Ville laboratory of Strasbourg organizes a two-days workshop dedicated to spatial microsimulation of social and environmental processes, with a specific focus on agent-based modelling and cellular-automata.

Various models developed at or in relation with Image et Ville will be presented (see program below).

The workshop will take place at the Geography Department, University Louis Pasteur, Strasbourg, the 26th and 27th of March, 2007.

S4 and CO-SMA-GEM members are welcome to apply for the workshop.

The deadline for application is 12 march 2007.

We are looking forward to meet you in Strasbourg.

Please, send an email to Arnaud Banos[1] for any enquiry or inscription. More information will be available from the website http://imaville.u-strasbg.fr/.

Information concerning accommodation and transportation facilities are provided on the link http://imaville.u-strasbg.fr/informations.html

Best regards,

Arnaud Banos and Christiane Weber

[1] arnaud.banos@lorraine.u-strasbg.fr

Detailed program

Day	9h-9h30	9h30-10h30	10h45-11h30	11h45-12h30	12h30-14h	14h15-15h	15h15-16h	16h15-17h	17h15-18h15	20h
Monday 26/03	Participants Welcome	**M. Bruse** Inst. of Geography, Geoinformatics & GIS, University of Bochum	**B. Soulet** *(ESPACE)* SegreMaab	**V. Lapperière** *(SET)* SIMPEST	**Lunch**	**D. Badariotti** *(SET)* SIM-Bogota	**S. Lassarre** *(INRETS)* SAMU	**A. Banos** *(LIV)* MAGE	Discussion / Play with models	**Diner**
Tuesday 27/03	Participants Welcome	**P. Cabral** ISEGI - Universidade Nova de Lisboa	**D. Moreno** *(SET)* REMUS	**J.-P. Antoni** *(TheMA)* CWS-CamDeus	**Lunch**	**C. Enaux** *(LIV)* SIMDEP	**C. Lang** *(LIFC)* **N. Marilleau** *(IRD)* MIRO	**A. Banos** *(LIV)* SMArtGeo	Discussion / Play with models	X

Keynote Speakers:

Michael Bruse, Inst. of Geography, Geoinformatics & GIS, University of Bochum: Simulating the impact of thermal comfort on urban open spaces usgae with a Multi-Agent System

Pedro Cabral, ISEGI - Universidade Nova de Lisboa: Simulation of urban dynamics: comparison and evaluation of urban patterns

Model name: SegreMaab

Does it belong to a wider research project ?
This model results from a thesis in geography. It is integrated in work of the « simulation and artificial territories » group, directed by Jean-Luc Bonnefoy and inclu in axis 4 of the UMR 60012 ESPACE.

Main objectives of the model :
This model simulates the emergence of space structure of the residential segregation in Marseille urban area. The analysis, at the district level, concerns the period 1982-1999. Within the context of an experimental geography, we build an artificial territory allowing us to test a series of behaviour rules taken from literature about migrations. Our approach also tends to link two levels of aggregation relatively apart: on the one hand the micro-geographic level, concerning individuals, their representations and their spatial decisions ; on the other hand the macro-geographic level, focused on the study of the spatial structure of segregation.

Model family (CA, ABM-MAS…): MAS

Domains of application of the model: Urban geography

Possible list of scientific papers published with reference to this model:

SOULET B., [2002], « Simulation multi-agents et migrations résidentielles : une application à l'espace français », Mémoire de DEA (sous la direction de Jean-Luc Bonnefoy) de l'Université de Provence, 55 p.
SOULET B. [2006], « Reliance entre analyse spatiale et géographie sociale. Pour une lecture complexe de l'espace des sociétés », in actes du Colloque Géopoint, Université d'Avignon, 8 et 9 juin (à paraître).

Model Name: SIMPEST

Does it belong to a wider research project ?
Yes : ACI CNRS : "systèmes complexes en Sciences Humaines et Sociales" 2004-2007

Main objective of the model:
SIMPEST is an explanatory model which simulates bubonic plague epidemics at a local scale, taking into account the spatial behaviour of the agents involved into the epidemiological cycle.
We perform sensitivity analysis to study the influence of some initial conditions, reflecting the geographical local context of the epidemic, on the global force of the infection.

Model family (CA, ABM-MAS…):
Agent Based Model.

Domains of application of the model:
Medical geography - spatial epidemiology.

List of scientific papers:

BADARIOTTI D., BANOS A., LAPERRIERE V. (2007). "Systèmes complexes et catastrophes épidémiques. L'apport de la modélisation individu-centrée à l'étude des catastrophes sanitaires : le cas de la peste à Madagascar", Actes des 14èmes Journées de Rochebrune, Megève : 21-27 janvier 2007, Editions ENST (Paris), pp. 33-44.

BADARIOTTI D., BANOS A., LAPERRIERE V. (2006). "Simpest : un modèle contingent à base d'agents pour simuler les épidémies de peste à Madagascar", Colloque Sagéo, Strasbourg : 11-13 septembre 2006, 19 p.

Model Name: MAGE

Belonging to a wider research project:
Cooperation between SET (Pau), LIV (Strasbourg), Géographie-Cité (Paris) and RATP (Paris)

Main objective of the model:
Simulation of pedestrian flows in subway stations

Model family: ABM (Brownian agents)

Domain of application: Pedestrian flow regulation

List of scientific papers:
BANOS Arnaud, CAMPS Jean-Baptiste, CHARPENTIER Angèle, 2006: Simuler les déplacements de piétons dans une station de métro, Colloque SAGEO'06, 11-13 Septembre, Strasbourg, 18 p.

Model Name: SMArtGeo

Belonging to a wider research project:
Initially developed in Pau (SET/UPPA), currently developed in Strasbourg (LIV/ULP)

Model family: CA/ABM

Domains of application:
SMArtGeo is a pedagogic suite, providing agent based approaches of classical spatial models:

- SMArtGAM : the Geographical Analysis Machine (Stan Openshaw)
- SMArtKDE : Kernel Density Estimation
- SMArtUrb : urban growth model (DLA/Percolation)
- SMArtAquarium : Hagerstrand ' spatio-temporal aquarium

List of scientific papers:
http://web.univ-pau.fr/~banos/smartgeo.html

Model Name: SAMU

Belonging to a wider research project:
Part of a franco-indian project on microscopic multi-road users urban traffic simulation, in order to assess the exposure to the accident risk of all the road users.

Main objective of the model:
A simulation platform of the GOALSim (GOdara-Arnaud-Lassarre Simulation) model of pedestrian/vehicle interaction on an Urban Network

Model family: CA/ABM

Domains of application:
Microscopic urban traffic simulation, road accident risk analysis, transportation planning.

List of scientific papers:

BANOS Arnaud, GODARA Abhimanyu, LASSARRE Sylvain, 2005: Simulating pedestrians and cars behaviours in a virtual city : an agent-based approach, Proceedings of the European Conference on Complex Systems, Paris, 14-18 November, 4 p.

GODARA Abhimanyu, LASSARRE Sylvain, BANOS Arnaud, 2006: Simulating pedestrian-vehicle interactions in urban network using cellular automata and multi-agent models. Proceedings Traffic & Granular Flow'05, A. Schadschneider Ed., Springer –Verlag, 2006.

Model Name: REMUS (Reticular Model for Urban Simulation) **Belonging to a wider research project?** Yes, it belongs to the research project: Spatial behavior of individual actors and social and spatial emergencies. **Main objective of the model:** To simulate urban phenomena using network distances as proximity model. **Model family (CA, ABM-MAS…):** Graph-based cellular automata **Domains of application of the model:** Social and land-use modelling, network distribution **List of scientific papers:** BADARIOTTI D., BANOS A., MORENO SIERRA D. Modélisation de la structure spatiale urbaine par un automate cellulaire non stationnaire: le modèle Remus. Colloque International de Géomatique et Analyse Spatiale: Recherches et Développements. Strasbourg, 11-13 septembre 2006 MORENO SIERRA D. De la structure spatiale aux dynamiques urbaines: Les automates réticulaires. RTP MODYS, Réseau thématique pluridisciplinaire Modélisation et Dynamiques Spatiales, Département SHS-CNRS, Maison de l'Orient et de la Méditerranée, Lyon, 8-9 novembre 2006. BADARIOTTI D., BANOS A., MORENO SIERRA D. Le modèle Remus: morphologie, voisinages et discontinuités urbaines. Rencontres ThéoQuant 2007 - Nouvelles appoches en géographie théorique et quantitative. Besançon, 10-12 janvier 2007. BADARIOTTI D., BANOS A., MORENO SIERRA D. Discontinuités, catastrophes et réseaux urbains: le modèle Remus. 14èmes journées de Rochebrune. Megève, 21-27 janvier 2007.	**Model Name: CWS** (Cellular world simulation) **Belonging to a wider research project:** the original collaboration took place between Image et Ville and the Urban planning agency of Belfort. The model is currently enhanced at ThéMA (VMT team). **Main objective:** to simulate urban growth **Model family:** cellular automata constrained by a markovian process and a potential model **Domain of application:** Urban planning, evaluation of politics, accompanying projects **List of scientific papers:** 2006 – ANTONI J.P, Cellular world simulation: A collaborative model for spatial visioning and Territorial Intelligence, International conference "Region, identity and sustainable development", Organised in the framework of CAENTI, University 1er Decembrie 1918, Alba Iulia (Romania), September 21st-22nd 2006, 5 p. (to appear) 2006 - ANTONI J.P., THEVENOT J., Scénario pour limiter l'étalement dans un SCoT. Dessiner les possibles. Hypothèses, projection et inflexion, Actes du séminaire de l'observation urbaine,20 octobre 2005, Certu - Fnau – Insee, Janvier 2006, Ministère des Transports, Cete de Lyon, pp. 29-35 2005 - ANTONI J.P., THEVENOT J., Modélisation et prospective territoriale : la démarche SCoT de Montbéliard appuyée sur le modèle CWS, Signature, Lettre de l'information géographique du CERTU, Décembre 2005, n°31, pp. 11-17 2004 - ANTONI J.P. Étalement urbain et modélisation prospective à Belfort, Images de Franche-Comté, n°30, décembre 2004, pp. 22-24.

Model Name: MIRO

Belonging to a wider research project ?
Part of a national project sponsored by the ministry of tranportation (PREDIT program)

Main objective of the model: to model and simulate the "swarming" city, using multi-agents systems.

Model family (CA, ABM-MAS...): MAS model

Domains of application of the model: time geography, simulation of Distributed Systems

List of scientific papers:

A. Banos, S. Chardonnel, C. Lang, N. Marilleau, and T. Thevenin. Approche multi-agents de la ville en mouvement. Réflexions autour du projet MIRO (Modélisation Intra-urbaine des Rythmes quOtidiens). In procs. of the joint Conf. on Multi-Agent Modeling for Environment Management, CABM-HEMA-SMAGET 2005, Bourg St Maurice-Les Arcs, France, March 2005, 14p..

A. Banos, S. Chardonnel, C. Lang, N. Marilleau, and T. Thevenin. Simulating the swarming city: a MAS approach. In procs. of The 9th Int. Conf. on Computers in Urban Planning and Urban Management, CUPUM 2005, London, UK, June 2005, 15 p.

N. Marilleau, C. Lang, P. Chatonnay, and L. Philippe. An Agent-Based Framework for Urban Mobility Simulation. In Procs of the 14th IEEE Euromicro Conference on Parallel, Distributed and Network based Processing (PDP 2006), Montbéliard, France, pages 355-361, February 2006

N. Marilleau, C. Lang, P. Chatonnay, and L. Philippe. A Meta-Model of Group for Urban Mobility Modeling. In procs. of The Third Int. Conf. on Active Media Technology, AMT 2005, Takamatsu, Japon, pages 397-400, May 2005

Model Name : Activity/mobility space theory

Belonging to a wider research project ? ATIP JEUNE CHERCHEUR 2005 : representations as a means of understanding daily mobility : their incidence on the choices of activity places.

Main objective of the model: The theory explains the individual activity space construction, taking into account the cognitive representation of space, of activity, etc.
Later on, the objective will be the simulation of the individual activity spaces in a MAS approach.

Model family (CA, ABM-MAS...): MAS

Domains of application of the model : any domain integrating the population's spatio-temporal distribution at a weekly scale (studies of daily mobility, of pollution/contamination exposure, urban traffic, etc)

Model Name: SIM-Bogota / SIM-SMA

Belonging to a wider research project ? PSIG98 : "modélisation dynamiques des interactions entre formes de mobilité et recomposition territoriale"

Main objective of the model: Dynamic study of the effects of residential mobility on urban social landscape.

Model family (CA, ABM-MAS...): Sim-Bogota AC / SIM-SMA MAS

Domains of application of the model: Urban residential mobility, taking into account segregation between several communities.

List of scientific papers:
Badariotti Dominique, Weber Christiane (2002) "Automates cellulaires et multi-agents. Deux prototypes de modélisation de la mobilité résidentielle intra-urbaine." - L'Espace Géographique, n° 2/2002, p. 97-108