

GeoComputation 2007



The Art and Science of Solving Complex Spatial Problems with Computers.

Preliminary programme

Keynote addresses

Geovisual Analytics and the Need for Geocomputation

Prof. Menno-Jan Kraak

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ICA Research Agenda on Cartography and Geoinformation Science

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Abstracts accepted for oral presentation

Agent-based modelling

- Nicolas Malleon, *Agent-Based Modelling and Crime in Leeds*
- S. Dragičević, *Embedding spatial agents into irregular cellular automata models of urban land use change to improve scenario exploration and decision making*
- Sk. Morshed Anwar, Lael Parrott, Danielle Marceau, *Multi-agent modelling of whale-watching excursions in the Saguenay St. Lawrence Marine Park (SSLMP) in Quebec, Canada*
- Moira L. Zellner, Thomas L. Theis, *New Frameworks for Urban Sustainability Assessments: Linking Complexity, Information and Policy*
- Walid (Oualid) Ali, Bernard Moulin, *MultiAgent GeoSimulation of human behaviors in micro-scale geographic environments: The case of the shopping behavior in a mall*
- N. Jabeur, P.A. Graniero, *Agent-Based Clusters to Virtually Manage Spatially Distributed Sensors*
- Oswald Devisch, Theo Arentze, Aloys Borgers, Harry Timmermans, *Employing agents to develop integrated urban models - numerical results from residential mobility experiments*
- Benenson, K. Martens, S. Birfir, *Parking in the City: The Model as a Tool for Policy Evaluation*
- B. M. Wu, M. H. Birkin and P. H. Rees, *Bringing agents into the spatial microsimulation*
- Andrew Crooks, Christian Castle, and Michael Batty, *Key Challenges in Agent-Based Modelling for Geo-Spatial Simulation*
- Y. Li, A. J. Brimicombe, C. Li, *Agent-Based Services for Validating Multi-Agent Models*
- David Bennett and Wenwu Tang, *Representing Complex Adaptive Spatial Systems*

Algorithms and architecture

- A.T. Murray, T.C. Matisziw, D. Tong, H. Wei, *GeoComputational Approaches to Coverage Maximization in Service Facility Siting*
- Chris Brunson, *Path Estimation from GPS Tracks*
- M.E. O'Kelly, Michael Niedzielski, *Computing and calibrating disaggregated spatial interaction models*
- P. Lewis, T. McCarthy, A. Winstanley, A. S. Fotheringham, *Software algorithm for decoding GPS from spatially encoded video*
- Ningchuan Xiao, *Considering Diversity in Spatial Decision Support Systems*
- Jesse Blum, Kenneth J. Turner, Sandy Winterbottom, *Cumulative Viewshed Analysis using GRID Computing*

- J. K. McGrath, J. P. O’Kane, K. J. Barry, R. C. Kavanagh, *Channel-adaptive Interpolation for Improved Bathymetric TIN*
- B.G. Lees, Q.K. Yang , D.L. Jupp, *Re-scaling Terrain Variables*
- Tonny J. Oyana, *A Geospatial Implementation of a Novel Delineation Clustering Algorithm Employing the K-means*
- Peter Mooney and Adam Winstanley, *Applying Recommendation Algorithms to Collections of Geospatial Metadata*

Applications - environment and ecology

- Seamus Coveney, Stewart Fotheringham, Martin Charlton, John Sweeney, *Dual-frequency GPS survey for validation of a regional DTM and for the generation of local DTM data for sea-level rise modelling in an estuarine Salt Marsh.*
- J.A. Downs, M.W. Horner, *Network-Based Kernel Density Estimation for Home Range Analysis*
- G. L. Heritage, A. Chappell, *Estimating hydraulic and aerodynamic roughness using illumination and shadow of digital elevation models*
- Brenton S. Chatfield, *Uncovering the Secrets of Rare Species: Can Community Level Modelling Help?*
- Edward Nash, Jans Bobert, Karl-Otto Wenkel, Wilfried Mirschel, Ralf Wieland, *Geocomputing Made Simple: Service-Chain Based Automated Geoprocessing for Precision Agriculture*
- ZHANG Li, CHEN Xiao-Ling, *Spati-temporal Changes of NDVI and Their Relations with Precipitation and Temperature in Yangtze River Catchment from 1992 to 2001*
- Zhang Ting, Tang Guo-an, Liu Xuejun, Zhou Yi, Jia Dunxin, *Spatial pattern of channel network in Jiuyuangou drainage basin*
- V.I. Adamchuk, D.B. Marx, A.T. Kerby, A.K. Samal, L.K. Soh, R.B Ferguson, C.S. Wortmann, *Guided Soil Sampling for Enhanced Analysis of Georeferenced Sensor Based Data*
- D. L. McGinnis, C. Anderson, M. W. Williams, D. A. Bennett, *Multifaceted Geocomputation to Support Ecological Modelling in Yellowstone*
- B. Radford, N. Goldberg, K. Holmes, K. van Neil, and G. Kendrick, *Can general models of marine biota be applied broadly for accurate and affective habitat mapping?*
- H. S. Hansen, *Land-use modelling in a transnational context*
- Y. S. Choi, H. D. Park, C. Sunwoo, *Multi-Criteria Evaluation and Least Cost Path Analysis for Optimal Haulage Routing in Open-Pit Mines*
- Abdolrassoul S. Mahiny, *Patch Metrics as Surrogates of Structural Complexity of Remnant Vegetation*
- Magda Biesiada, Marie-Josée Fortin, Trisalyn Nelson, *Spatial Distribution of Mountain Pine Beetle in the Morice Timber Supply Area in Western British Columbia between 1995 and 2002*
- Jennifer A. Miller, *Using simulated data to explore the effects of spatial structure, sampling strategy, and statistical methods on species distribution models*
- Chappell, C. T. Agnew , *The need for spatial uncertainty in climate data: an example from west African Sahelian rainfall (1930-1990)*

Applications – health

- Karyn Morrissey, Graham Clarke, Dimitris Ballas, Cathal O’Donoghue, *Accessibility to Health Care in Rural Ireland*
- G.P. Malanson, *Cellular Landscapes and Infectious Disease*
- Ronan Foley, Martin Charlton, *Modelling Changing Hospital Service Accessibility in Ireland 1999-2006*
- Howard Johnson, Mel McIntyre, *Health Atlas Ireland*

Applications – urban modelling

- Dr. Sharaf Al-kheder, Dr. Naif Hadad, Leen Fakhoury, Suha Baqaen, *Spatial Modeling and Assessment of the Interaction between Modern and Heritage Urban Landscapes with GIS - A case study of Irbid city, Jordan*
- G. Borruso, V. Iacoviello, A. Porceddu, *GIS and geostatistics for modelling urban times in neighbouring border cities*
- Alex Hagen-Zanker, *Quantification and classification of urban change patterns*
- C. Chalkias, S. Kalogirou, *Estimating Light Pollution in Suburban Areas with complex Topography*

- Rich Harris, *Modelling school catchments, choices and ethnic segregation: a geocomputational approach*
- Atsushi Nara, Paul M. Torrens, *Fractal Analysis of Pedestrian Egress, Behavior and Efficiency*
- Victor Lobo, Pedro Cabral, Fernando Bação, *Self Organizing Maps for Urban Modelling*
- Meredith D, Charlton M. , Foley R. , and Walsh J., *Identifying Travel to Work Areas in Ireland: A Hierarchical Approach using GIS*
- B. Barboni, U. Schiavoni, *The breaking points in the “green corridors” due to new Master Plan of Rome*

Cellular automata

- Roger White, Inge Uljee, *Multi-Scale Modelling of Population and Land Use with a Variable Grid CA*
- N. L. Moreno and D.J. Marceau, *Performance assessment of a new Vector-based Geographic Cellular Automata Model*
- Yaolong Zhao, Yuji Murayama, *A Constrained CA Model to Simulate Urban Growth of the Tokyo Metropolitan Area*
- Shawn W. Laffan, Eugene Lubarsky, Michael P Ward, Linda D. Highfield, *A geographic automata system for modelling disease outbreaks in wild and unfenced animal populations*

Data mining

- T. K. T. Le, R. J. Abraham, N. J. Mount, *M5 Model Tree applied to modelling town centre area activities for the city of Nottingham*
- M-T. Kechadi, M. Bertolotto, S. Di Martino, F. Ferrucci, *A 2-Pass Data Mining Technique for Spatio-Temporal Datasets*
- Ian Turton, Mark Gahegan, Anuj Jaiswal, *Geographic Information Retrieval from Disparate Data Sources*

Evolutionary computing

- R. A. Wadsworth, *Zen and the Art of GIS: Visualising what can't be seen*
- Dajun Dai and Tonny J. Oyana, *A genetic algorithm for spatiotemporal cluster detection and analysis*

Fuzzy modelling

- H. Scherthanner, *Fuzzy Logic Method for Landslide Susceptibility Mapping, “Rio Blanco”, Nicaragua*
- G. A. Mason, R. D. Jacobson, *Fuzzy Geographically Weighted Clustering*

Geovisualisation & Geovisual Analytics

- D. Andrieu, C. Kaiser, A. Ourednik, J. Lévy, *Advanced cartogram construction using a constraint based framework*
- Stephane Joost, Abram Pointet, *A dedicated Geographic Exploration Interface for the monitoring of worldwide Farm Animal Genetic Resources*
- G. Andrienko, N. Andrienko, *Implementing Visual Analytics Methods for Massive Collections of Movement Data*
- Alex Singleton, Maurizio Gibin, Paul Longley, *Exploratory Cartographic Visualisation of Health and Higher Education the through Google Maps API*
- Suwen Wang, Robert Beiko, Stephen Brooks, *Collapsible 3D Terrains for GIS Visualization*

Remote sensing

- George Ch. Miliareisis, *Delineation & Representation of Linear Megadunes from CSI-SRTM DEM*
- J.A. Corter, P.L. Guth, *Unsupervised Classification of Submarine Landslides*
- Máirtín. P. Mac Siúrtáin, *The Roy Bose simultaneous confidence interval approach to multivariate multitemporal pairwise comparisons within and between objects*

- Delfina Neves, Cláudio Carneiro, *Semi-automatic Use of High Resolution Images and Digital Elevation Models for Counting and Identification of Forest Trees*
- GONG Jian-Ya, *The developing Actuality of Photogrammetry and Remote Sensing Technology in China*
- YIN Shou-Jing, CHEN Xiao-Ling, *Reducing Boundary Effects in Image Texture Segmentation Using Weighted Semivariogram*
- Zhiyong Jiang, Xiaoling Chen, *Research on remote sensed image Classification Based on morphological feature extraction*
- C. Bielski, J. Grazzini and P. Soille, *The Little Algorithm that Grew: Scaling the Morphological Image Compositing Algorithm to meet the Challenges of Processing Large Image Data Sets*
- Victor Mesev, *Integrative spatial-spectral-temporal remote sensor models of urban configuration and sustainability*

Semantics, ontologies, conceptual modelling

- Tawan Banchuen, *The Geographical Analog Engine: Weighted Euclidean and Semantic Similarity Measures for U.S. Cities*
- James D. McCarthy, Phil A. Graniero, *Reasoning-Ready Sensor Data*
- Ola Ahlqvist, *The geo-attribute space: a general space-time-property representation*
- Ningchuan Xiao, Ola Ahlqvist, Mei-Po Kwan, *Public Participation GIS for the General Public?*
- S. Steiniger, P. Taillandier, *Improving Map Generalisation of Buildings by Introduction of Urban Context Rules*
- Allan Third, Brandon Bennett and David Mallenby, *Automatic Grounding of Vague Geographic Ontology in Data*
- Barbara Hofer, *How to Identify Types of Spatial Processes - An Example*

Spatial networks

- D. M. Mountain, J. L. Y. Tsui, J. F. Raper, *Modelling accessibility via transportation networks based upon previous experience: a Geographically Weighted Regression approach*
- Sanjay Rana, *Novel Structural Analyses of Surface Networks*
- C. Olden, G. E. Taylor, *Heuristically Driven Random Walks Across Large Scale Graphs*
- S. Porta, V. Latora, *Correlating street centrality with commerce and service location in cities*

Spatial statistics

- Yichun Xie and Xinyue Ye, *Multi-category Tempo-Spatial Pattern Analysis (McTSPA)*
- Devis Tuia, Christian Kaiser, A. DaCunha, M. Kanevski, *Socio-economic cluster detection with Spatial Scan Statistics. Case study: services at intra-urban scale*
- Graham Squires, Richard Kingston, *Exploring housing patterns and dynamics in low demand neighbourhoods using Geographically Weighted Regression*
- Yilin Liu and David Jarrett, *Spatial Statistical Modelling of Traffic Accidents*
- Nicholas Nagle, *On block bootstrapping areal data*
- J. F. Conley, I. J. Turton, M. N. Gahegan, *Using Image Moment Invariants to Distinguish Classes of Geographical Shapes*
- Caroline Crowley, Jim Walsh, *A Local Regression Analysis of Irish Farm Census Data*
- T. Hengl, B. Bajat, H.I. Reuter, D. Blagojević, *Geostatistical modelling of topography using auxiliary maps*
- Ricardo Crespo, Stewart Fotheringham, Martin Charlton, *Application of Geographically Weighted Regression to a 19-year set of house price data in London to calibrate local hedonic price models*
- P. C. Kyriakidis, M. F. Goodchild, *Geostatistical Alternatives for Incorporating Covariates in Areal Interpolation*
- Jacopo Grazzini, Pierre Soille and Conrad Bielski, *On the use of geodesic distances for spatial interpolation*
- T. Cheng, J. Wang, X. Li, *The Support Vector Machine for Nonlinear Spatio-Temporal Regression*
- R. Kerry, M. A. Oliver, *The Effects of Underlying Asymmetry and Outliers in data on the Residual Maximum Likelihood Variogram: A Comparison with the Method of Moments Variogram*

- Daniel J Grose, Richard Harris, Chris Brundson, and Dave Kilham, *Grid Enabling Geographically Weighted Regression*

Spatio-temporal modelling

- Harvey J. Miller, Scott A. Bridwell, *Time geographic fields: A continuous velocity theory for time geography*
- Olga Špatenková, Urška Demšar, Jukka Krisp, *Self-Organising Maps for exploration of spatio-temporal emergency response data*

Posters

- J. Negreiros, A. C. Costa, M. Painho, J. Santos, I. Lopes, *Geostatistical Analysis: Software Flashpoint*
- Georg Gartner, *Smart Environments and LBS to support pedestrian navigation*
- B. Melo, C. L. Nascimento Jr, *Forecasting Using the Mixture of Local Expert Models*
- Qiu Bingwen, *Land use change simulation model based on MCDM and CA and its application*
- Pavel Děrgel, Petr Fuks, Lucie Hrubá, *Traffic simulation environment for Multi-Agent systems based on GIS*
- Ellen-Wien Augustijn-Beckers, Rolf A. de By, *Towards routine large-scale, discrete spatial event simulations*
- P.L. Guth, *Global SRTM Geomorphometric Atlas*
- J. Heppenstall, A.J. Evans and L.M. See, *Non-linear behaviour, emergence, and complexity in geographical systems*
- T. Neutens, T. Schwanen, F. Witlox and Ph. De Maeyer, *Towards a Measure of Joint Space-Time Accessibility: Conceptualization and Theoretical Framework*
- R. Zhumagulova, D. M. Mountain, C. Rhin, *Evaluating location-based functionality from the perspective of the user: a case study from the Greenwich Observatory*
- T. K. Remmel, A. H. Perera, *Geospatial Techniques for a Multi-Resolution Assessment of Post-Fire Boreal Vegetation Residual Patterns*
- Thierry Joliveau and Sanjay Rana, *Using Urban Viewsheds for Embedding Geographical Context in Photograph Databases of Urban Areas*
- L. Hashemi Beni, M. A. Mostafavi, M. L. Gavrilova, *Moving Objects Management in a 3D Dynamic Environment*
- R. Thibaud, P.L. Guth, P. Alessio, and S. Méline, *TCP Interface To Access the MICRODEM GIS Engine*
- Jian Wang, G.H. Gan, Yong Xu, Z.Q. Wang, *Geography Cartography Service: A Case Study of On-Demand Geo-Computing*
- K. W. Holmes, B. Radford, and K. P. Van Niel, *Marine versus terrestrial predictive mapping: Geographic modelling constraints of working underwater*
- Plazanet, V. Silva, *Vector Approaches to Urban Morphogenesis Modelling*
- Y. Hu, A.R. Watkinson, A.A. Lovett, *Land Use Change Modelling Using Markov Chain and Neural Network: Potentialities and Limitations*
- Mohammad Saeed zaeri, Jamal Shahrabi, Mahmood Pariazar, *Using Spatial Data Analysis in Distribution System Design*
- Y. H. Zeng, Z.H. Tian, *An automatic updating method for geospatial data with lightweight network GIS*
- Gordon Green, Sean Ahearn, Ryan Carney and Alan McConchie, *Deriving Cellular Automata Rules for Areas at Risk of West Nile Virus Infection*
- Amir Bonyad, *A new geocomputational algorithms for forest classification and mapping using satellite remote sensing data*
- Yuefeng Liu, Xin Zhang, Huabo Sun, *Complete Route Computing for Non-drivers Based on Public Transport Network and Pedestrian Network*