A special issue on **Cyberinfrastructure, GIS and Spatial Optimization** with *International Journal of Geographical Information Science*

Spatial optimization is a powerful spatial analysis technique to exploit the optimal solution(s) within a large number of alternatives. The formulation of such problems involves maximizing or minimizing one or more objectives subject to satisfying one or more constraints where the solution techniques often rely on Mixed Integer Programming (MIP) or specialized heuristic algorithms. Spatial optimization techniques have found numerous geospatial applications, such as location-allocation modeling, land use allocation, regionalization, and planning. As most such problems are NP hard in nature, even a small dataset will generate a complex solution space and therefore could take a significant amount of time to solve. While interest in large-scale geospatial analyses is on the increase, the complexity in solving such problems tends to increase as an exponential function of size. Meanwhile, the accuracy of the modeling results is heavily dependent on the accuracy and completeness of the input data, which most likely exists in heterogonous formats, and distributed in different Web locations. Traditional manual data collection and compilation mechanisms for optimization modeling may no longer be suitable for today's big data paradigm. Moreover, spatial decision-making almost always involves collaborations among physically distributed individuals and therefore requires a virtual and collaborative environment to enable an interactive and dynamic decision-making support process.

Cyberinfrastructure (CI), which has been emerging as a novel software platform, offers new opportunities for spatial optimization model development, solution techniques and applications. This advanced software infrastructure, relying on high performance computing facilities and high speed Internet, is potentially capable of handling data- and computational- intensive problems efficiently and effectively, or realistically approach what has been considered in the past as non-solvable. Besides computing, Cyberinfrastructure also supports advanced data acquisition, data storage, data management, data integration, data mining, and data visualization for various online spatial decision-making support purposes. The marriage between CI and spatial optimization will extend the geospatial capability of Cyberinfrastructure and help to improve geospatial knowledge discovery by solving problems at a size and scale which is not possible using traditional GIS platforms. This special issue of the *International Journal of Geographical Information Science* is one of the first efforts to capture the latest advancements in this direction and to develop an initial research agenda in this area domain. We are seeking original unpublished papers that describe recent advances and efforts in exploiting CI solutions for spatial optimization models, algorithms and applications.

Suggested topics include (but are not limited to):

- Vision of cyberinfrastructure and spatial optimization
- New computing architecture (e.g. high performance computing, cloud computing, GPGPU computing) for optimization modeling
- Design of scalable algorithms to solve computational intensive spatial optimization problems, e.g. site selection problems, route planning problems, regionalization problems etc.
- New data acquisition techniques for spatial optimization
- Spatial decision (planning) support with cyberinfrastructure
- Land use planning and resource management problems
- Ontologies and semantics research for spatial optimization
- Spatiotemporal optimization problems
- Applications of spatial optimization in social science, environmental science and other science domains.

Submission:

All manuscripts including any support material should be submitted using the journal's online Manuscript Central facility (http://mc.manuscriptcentral.com/ijgis). Guideline for submission can be found at: http://www.tandfonline.com/action/authorSubmission?journalCode=tgis20&page=instructions/. International Journal of Geographical Information Science considers all manuscripts on the strict condition that they have been submitted only to International Journal of Geographical Information Science, that they have not been published already, nor are they under consideration for publication or in press elsewhere. Authors must select "Special Issue Paper" when they reach the "Article Type" step in the submission process, and identify this special issue in their cover letter. First-time users must register themselves as Author.

Important dates:

• March 1, 2014, abstract submission to guest editors
• March 15, 2014, full paper submission invited
• August 1, 2014, full paper submission to IJGIS online submission system
• December.15, 2014, paper acceptance notification
• February 1, 2015, paper in final form
• April 1, 2015, special issue published (estimated)

Guest Editor:

Wenwen Li, School of Geographical Sciences and Urban Planning, Arizona State University, Email: Wenwen@asu.edu

Kai Cao, Department of Geography, National University of Singapore, Email: kaicao@pitt.edu

Richard Church, Department of Geography, University of California, Santa Barbara, Email: church@geog.ucsb.edu