

## Proposal for pre-conference workshop – AGILE 2017 Wageningen, Tuesday 9 May 2017

<http://www.agile-online.org/index.php/conference/conference-2017>

### 1. Workshop name/title (and acronym is applicable)

Workshop on Graph Models and Optimization in GI science

### 2. Description of the workshop by listing topic(s), objective(s) and planned outcome(s)

#### 2.1 Topic(s)

- Methods from operations research for spatial analysis and planning
- Spatial optimization and optimization in spatial decision support systems
- Route-choice models and algorithms for route planning
- Analysis of movement constrained to networks
- Concepts of centrality and connectivity in GI science
- Algorithms for the visualization of geographic networks
- Optimization methods for geometric problems in GI science
- Computational complexity of problems in GI science
- Innovative unsolved optimization problems in GI Science.

#### 2.2 Objective(s)

The aim of the workshop is to develop a community working on graph models and algorithms as well as optimization in GI science. Research on these topics exists in different branches of spatial science (e.g., spatial planning, geographic analysis, cartography), but there is a lack of a common forum.

#### 2.3 Planned outcome(s)

*We will invite prospective workshop participants to submit papers, which will be reviewed by the programme committee. All manuscripts accepted for presentation at the workshop will be (1) distributed to the workshop participants as “draft papers” and (2) conditionally accepted for a special issue of the journal “Photogrammetrie, Fernerkundung, Geoinformation: Journal for Photogrammetry, Remote Sensing and Geoinformation Science” (which from January 2017 on will be published by Springer). That is, the papers will be*

*published in the journal if the reviewers' comments are incorporated, which will be checked in a second review round after the workshop.*

### **3. Abstract**

Graphs are mathematical models that are commonly used to represent networks and maps. Therefore, they are of fundamental importance in geographical information (GI) science. This workshop addresses graph models in spatial planning, geographic analysis and cartographic visualization, with the aim of intensifying communication between researchers who work with a similar methodology in these different branches of spatial science. We encourage contributions presenting mathematically rigorous models in graphs as well as algorithmic solutions for those models. Since solving a model usually means optimizing the level of fulfillment of an objective subject to a set of constraints, the workshop primarily addresses optimization algorithms, being they exact, approximate, or heuristic. A question that will be central to the workshop is how problems of high computational complexity (e.g., NP-hard problems) in GI science can be tackled. Do we accept suboptimal solutions for the sake of efficiency and, if so, how much optimality are we willing to compromise? How do we evaluate the results of heuristics? Which role do exact algorithms for NP-hard problems (e.g., mathematical programming solvers) play?

### **4. Short description of the intended length (half or full day) and the format of the workshop**

The workshop is planned for a half day, allowing two sessions with short presentations of papers (15 minutes presentation with additional 5 minutes of discussion for each paper, 6-8 papers in total) and a break-out session

### **5. Brief statement of the relevance of the workshop for AGILE**

We have seen very good research on the workshop topic at previous AGILE conferences, yet it seems to us that the community working on that topic is only loosely connected. We hope that the workshop will be a forum to intensify discussions, to build networks, and to attract new researchers to AGILE, e.g., researchers applying methods from operations research in spatial planning.

### **6. What is the approximate number of expected participants?**

We expect about 20 participants.

## 7. Names and e-mail addresses of the organizing member(s)

*Leading AGILE member (or sponsor) and contact person:*

Jan-Henrik Haurert, University of Bonn, Germany

*Contributing AGILE members (including the persons involved) – at least one seconding AGILE member is needed:*

Takeshi Shirabe, KTH, Stockholm, Sweden

*Contributing non-AGILE members (including the persons involved) – if applicable:*

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*Organizing Committee (if applicable):*

Jan-Henrik Haurert, University of Bonn, Germany

Takeshi Shirabe, KTH, Stockholm

*Programme Committee (if applicable):*

Jan-Henrik Haurert, University of Bonn, Germany

Takeshi Shirabe, KTH, Stockholm

Juha Oksanen, Finnish Geospatial Research Institute, Masala, Finland

Martin Nöllenburg, TU Wien, Austria

Thomas van Dijk, University of Würzburg, Germany

Ningchuan Xiao, Ohio State University, USA

(The researchers listed here have agreed to act as members of the programme committee. More reviewers may be added.)

## 8. Additional information about previous workshops, if held.

This will be the first workshop, probably of a new series.

## 9. Expected resources needed

*The workshop fee will cover the expenses. We expect to have wifi in the conference facilities. We need one lecture room for the presentations and space for three to four break-out groups. This can be closed rooms, quiet corners in a cafeteria, etc. After the break-out sessions, the workshop participants will reassemble in the lecture room.*

## **10. Other information**

In August 2016, Jan-Henrik Haunert took over the lead of the geoinformation group at the University of Bonn. An application for this group to become an institutional AGILE member has recently been submitted.

Submission by e-mail to: [Agile2017@wur.nl](mailto:Agile2017@wur.nl)