

Preface

In May of 2015, geospatial scholars from around the world came to the University of Texas at Dallas (UTD), in Richardson, TX, for Geocomputation 2015, which was convened by the following Organizing Committee (a mixture of spatial and computer scientists): Denis J. Dean and Daniel A. Griffith (co-chairs), Brian J.L. Berry, Yongwan Chun, Yan Huang, Fang Qiu, Weili Wu, May Yuan, and Kang Zhang. This was an international, peer-reviewed, full-paper conference concerned with (1) enriching geography and the spatial sciences with a toolbox of methods to model and analyze a range of highly complex, often nondeterministic problems; (2) exploring a middle ground from the doubly informed perspective of geography and computer science; and (3) developing truly enabling technology for the quantitative spatial scientist, technology that offers a rich source of computational and representational challenges for the computer scientist. How scholars deal with these developments is a significant and potentially transformative issue, one requiring a conscious attempt to move the research agenda from geographical information systems (GIS) back to geographical analysis and modeling, deemphasizing the technical aspects of GIS (e.g., databases, large monolithic systems that standardized on interfaces, file structures, and query languages) while emphasizing GIScience. Accordingly, the primary aims of this conference were to

- facilitate global networking between institutions and individuals;
- promote active collaboration among researchers from diverse parent disciplines;
- generate a framework allowing newcomers to see their work in an international context;
- act as a constructive forum for interdisciplinary discussion of research ideas;
- create an international focus for current state-of-the-art research;
- provide a mechanism for disseminating the latest innovations and discoveries;
- highlight the benefits and limitations of new computational techniques; and
- indicate fruitful directions for further research.

Scholars from geography, as well as many other disciplines, have gathered for the past two decades at a series of Geocomputation conferences to contribute to this discussion. The following list of some of the notable past keynote speakers gives a

notion of the range of these voices: Michael Batty (2011), Keith Clarke (2011), A. Stewart Fotheringham (2001, 2011), Mark Gahegan (2009), Menno-Jan Kraak (2007), Paul Longley (2013), Harvey Miller (2013), Peter Nijkamp (2011), Kirsi Virrantaus (2007), Shaowen Wang (2013), Jo Wood (2011), Xuejun Yang (2013), and Feng Zhao (2013). Those for the 2015 conference were Scott Morehouse, Shashi Shekhar, Dana Tomlin, Paul Torrens, and Michael Batty.

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The Symposium Series, the Venue, and the Conference Program

Geocomputation is conceptualized as the art and science of solving complex spatial problems with computers. For two decades, a loosely organized group of spatial scientists (e.g., <http://www.geocomputation.org/steer.html>) has been concerned with this broad theme. Since 1996, this interest group has facilitated the organization of an annual-that-has-become-a-biannual conference series: Geocomputation———. These conferences have been hosted solely by academic units at universities around the world (on four continents) and have attracted a diverse set of scholars from geography, computer science, geosciences, and the environmental sciences, as well as from government and other nonacademic organizations. Each conference has attracted between 80 and 300 participants, with a tendency for larger attendances at the more recent conferences. The quality of scholarly content is high: Short papers are submitted well in advance and subjected to a rigorous peer-reviewed process; the resulting series impact, being multidisciplinary and broadly international, has been substantial. The Geocomputation organization's Web site, <http://www.geocomputation.org/>, hosts all the conference papers, making conference findings openly accessible.

The 13th in this series, Geocomputation 2015, was held on the campus of the UTD, an innovative institution in the heart of North Texas that is part of the prestigious University of Texas System. It originally was the Texas Instruments Research Center and has grown since its founding in 1969 to include 133 degree programs, with cutting-edge curricula serving a variety of undergraduate and graduate student interests. The university continues its original commitment to providing some of the state's most lauded science and engineering programs and also has gained prominence for a breadth of educational paths, from criminology to biomedical engineering to arts and technology. Its Geospatial Information Sciences program is ranked first in Texas, first in both GIScience/Computation and Spatial Analysis/Statistics (according to *Geographical Perspectives* in 2015), and 16th in the nation (based on a 2010 study by Academic Analytics of Stony Brook, NY). This program spans the three Schools of Economic, Political and Policy Sciences, Natural Sciences and Mathematics, and Engineering, providing an ideal environment for hosting Geocomputation 2015.

Geocomputation 2015 was held May 20–23, 2015 (workshops on May 20; conference sessions on May 21–23). Cutting-edge research shared by participants from all over the world included

- new geocomputational algorithms and architectures;
- high-performance and cloud-enabled geocomputation;
- spatiotemporal modeling;
- geostatistics, spatial statistics, and spatial econometrics;
- geosimulation, agent-based modeling, and cellular automata;
- geovisualization and geovisual analytics;
- geospatial knowledge discovery and geospatial data mining;
- geospatial sensor web;
- various geocomputational applications;
- accuracy and uncertainty of geocomputational models;
- teaching geocomputation;
- applications in environmental, ecological, and biological modeling and analysis;
- applications in health and medical informatics; and
- applications in geodemographics, urban studies, criminology, and transportation modeling.

In addition to three peer-reviewed paper tracks resulting in both presentation and poster sessions, Geocomputation 2015 included keynote presentations by leading scholars, technical workshops aimed at training scholars in cutting-edge methodological approaches, and many opportunities for discussion and networking.

Most of the earlier conferences were held in Europe, with the 1997 conference being held in New Zealand, the 2001 and 2009 in Australia, and the 2013 in China, with only the 1999 and 2005 conferences being held in the USA. UTD hosted the conference in the USA for the first time in a decade. For this conference, the Organizing Committee established three concurrent sessions for peer-reviewed, accepted papers presented by general participants, with no competing session for the keynote speakers. The program for Geocomputation 2015 follows:

Workshops (either half-day or full-day)

Wednesday, May 20, 2015

8:00–9:00 A.M.	Breakfast
9:30 A.M.–12:30 P.M.	W1. Support vector machines for spatial and temporal analysis
	W3. Small area population estimation using areal interpolation
12:30–1:30 P.M.	Lunch
2:00–5:30 P.M.	W1. Support vector machines for spatial and temporal analysis

Conference

Wednesday, May 20, 2015

5:00–6:15 P.M. Conference opens (registration begins); and

6:00–7:30 P.M. Welcome reception.

Thursday, May 21, 2015

7:30–8:30 A.M. Breakfast

8:45–9:00 A.M. Welcoming remarks: Brian J.L. Berry

9:00–9:45 A.M. Keynote: Shashi Shekhar

9:45–10:30 A.M. Keynote: Scott Morehouse

10:45–11:15 A.M. Mid-morning break

11:15 A.M.–12:30 P.M. Sessions

A-1. Geocomputation and the Urban Environment
(Chair: Brian J.L. Berry)

A-2. Algorithms (Chair: Yan Huang)

A-3. Accuracy and Uncertainty in Geocomputation
(Chair: Daniel A. Griffith)

12:30–1:30 P.M. Lunch

2:00–3:40 P.M. Sessions

B-1. Agent-Based Models (Chair: Weili Wu)

B-2. Spatio-Temporal Geocomputation (Chair: May Yuan)

B-3. Geocomputation and the Natural Environment
(Chair: Fang Qiu)

3:40–4:10 P.M. Mid-afternoon break

4:10–5:50 P.M. Sessions

C-1. Spatial and Geostatistics I (Chair: Yongwan Chun)

C-2. Social Media (Chair: May Yuan)

C-3. High Performance (HP) and Cloud Computing
(Chair: Yan Huang)

6:00–7:30 P.M. Texas BBQ (Under the Trellis)

Friday, May 22, 2015

7:30–8:30 A.M. Breakfast

8:45–9:30 A.M. Keynote: Dana Tomlin

9:30–10:15 A.M. Keynote: Paul Torrens

10:30–11:00 A.M.	Mid-morning break
11:00 A.M.–12:15 P.M.	Sessions <ul style="list-style-type: none"> D-1. Geometry and Space (Chair: May Yuan) D-2. Geocomputation Simulation I (Chair: Brian J.L. Berry) D-3. Geocomputation and Species Modeling (Chair: Yan Huang)
12:30–1:30 P.M.	Lunch
2:00–3:40 P.M.	Sessions <ul style="list-style-type: none"> E-1. Spatial and Geostatistics II (Chair: Daniel A. Griffith) E-2. Cellular Automata (Chair: Fang Qiu) E-3. Geocomputation Time Modeling (Chair: Yongwan Chun)
3:40–4:10 P.M.	Mid-afternoon break
4:10–5:50 P.M.	Sessions <ul style="list-style-type: none"> F-1. Geocomputation Visualization (Chair: Fang Qiu) F-2. Geocomputation and Movement (Chair: Daniel A. Griffith) F-3. Artificial Intelligence and Data Mining (Chair: Weili Wu)
7:00–9:00 P.M.	Banquet dinner, Hyatt Regency, North Dallas
Saturday, May 23, 2015	
7:30–8:30 A.M.	Breakfast
8:45–9:30 A.M.	Keynote: Michael Batty
9:45–10:15 A.M.	Mid-morning break, Clarke Center, common area
10:15–11:30 A.M.	Sessions <ul style="list-style-type: none"> G-1. Geocomputation Simulation II (Chair: Brian J. L. Berry) G-2. Geocomputation, Data Mining, and Big Data (Chair: Yongwan Chun) G-3. Medical Geocomputation (Chair: Weili Wu)
11:50 A.M.–12:30 P.M.	Closing remarks
12:30 P.M.	Lunch

Posters were displayed throughout the conference in the lobby of the meeting facility. Participants were scheduled to present 71 refereed papers and display 13 refereed posters; best paper and poster prizes were awarded. This edited proceedings is one outcome of Geocomputation 2015.

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Daniel A. Griffith
Yongwan Chun
Denis J. Dean

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