PROPOSAL TO ACM FOR THE ESTABLISHMENT OF SIGSPATIAL

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Scope:

SIGSPATIAL provides a forum for researchers, engineers, and practitioners in all applications that involve spatial information. SIGSPATIAL will encourage:

- o Fundamental research in handling spatial information.
- o Participation in standardization activities including terminology, evaluation, and methodology.
- o Interdisciplinary education among spatial information researchers, students, and practitioners.

The field of spatial information handling is interdisciplinary and requires cross fertilization of several fields. SIGSPATIAL will collaborate with other related ACM SIGs, including SIGMOD, SIGMETRICS, SIGART, SIGMIS, SIGIR, SIGCHI, SIGCSE, SIGGRAPH, SIGWEB, etc., as well as non-ACM societies, such as AAAI, IEEE, AAG (Association of American Geographers), ACSM (American Congress on Surveying and Mapping), ASPRS (American Society for Photogrammetry and Remote Sensing), TRB (Transportation Research Board), and European societies such as AGILE (the Association of Geographic Information Laboratories for Europe, AGI (Association for Geographic Information) and EUROGI (European Umbrella Organization for Geographic Information). Researchers and practitioners from related disciplines (e.g.,

geography, civil engineering, natural resources management) will be particularly welcome in SIGSPATIAL.

1. **Primary focus of this special interest group with as much detail as possible:**

By means of advances and achievements, which started in the early 1960s, the field of spatial information handling has been consistently growing. Its importance continuouslincreases with the emergence of new application domains and with the availability and ubiquity of large spatial data such as maps, repositories of remote-sensing images, 3D medical atlases, and the decennial census. Businesses, industry, academia, and governmental agencies are utilizing spatial information to improve their daily operations, structure new strategies, and increase overall productivity. Applications of spatial information handling can be found in location-based services in the M(mobile)-commerce industry, strategic assessments in the military agencies, climatology studies (e.g., effects of tsunamis) in meteorological research, computer-aided design and computer-aided manufacturing (CAD/CAM) applications, medical imageries and atlases (e.g., 3D brain atlas), land-use classification of satellite imagery in urban planning, detection of local instability in traffic in the transportation groups, epidemiological pattern forecasting (predict spread of disease) in the healthcare field, analyzing crime hot spots in law enforcement applications, creation of high resolution three-dimensional maps from satellite imagery in intelligence information gathering, etc. [2, 5]. The Chorley report points out that 80% percent of data have spatial properties or a spatial reference [1]. Combined with the increased demand for spatial data processing, spatial information systems are gaining a substantial share across the spectrum in the industrial, government, and academic sectors [1, 3, 6-17, 19].

For the past twenty years, a number of educational institutions, e.g., NCGIA and UCGIS [18], have progressively integrated spatial information into their core curricula in order to address market demands. Spatial information permeates through a broad spectrum of subjects, fusing itself with disciplines such as business, law, engineering, and architecture. In the IT field, spatial information service is no longer an esoteric and an exclusive section but has grown to be one that merges with several facets of the IT industry. In the government sector, the European Commission in their March 2000 meeting established seven goals to be "the most competitive and dynamic economy in the world" with five of those goals directly involving spatial information handling [4].

The ACM Special Interest Group on Spatial Information (SIGSPATIAL) will be an association for researchers, students, developers, practitioners, and professionals interested in research, development, and deployment of solutions to spatial data, spatial operations, spatial information handling, and spatial knowledge extraction problems. The scope of interests of the members extensively covers areas from pure theory fields to more application-oriented research areas. The main areas of interest are listed below.

1. Spatial Information Acquisition
    o   Aerial Imaging and Photogrammetry

- o Classification Schemes
- o Collection Standards
- o Conflation
- o Digitization
- o Geocoding
- o Land Surveying and Global Positioning Systems (GPS)
- o Measurements and Sampling
- o Metadata and Standards
- o Positional Accuracy, Consistency, and Data Quality
- o Remote Sensing
2. Modeling
- o Algebras
- o Fuzzy Set Theory and Rough Sets
- o Data Semantics, including Ontologies
- o Raster vs. Vector
- o Relationships
- o Topology
- o Uncertainty
3. Data Structures and Algorithms
- o Computational Geometry
- o Distributed Computation
- o External Memory Data Structures
- o Geoprocessing and Map Production Algorithms
- o Network and Graph Algorithms
- o Parallel Computation
- o Representation Transformation
- o Scale, Generalization, and Aggregation
- o Storage, Access Methods, and Indexing
4. Analysis, Querying, and Integration
- o Data Integration
- o Data Mining and Pattern Discovery
- o Image Processing and Recognition/Computer Vision Techniques
- o Information Retrieval
- o Location Allocation
- o Network Analysis
- o OLAP
- o Query Processing and Optimization
- o Similarity Search and Approximate Matching
- o Statistical and Geostatistical Analysis
5. Human Computer Interaction and Visualization
- o 3D Visualization
- o Development Environments
- o Interface Design
- o Map Design and Production
- o Query Languages
- o Spatiotemporal Data Visualization

- Virtual and Immersive Environments
- Visual and Gesture Languages
6. Systems and Architectures
    - Data Stream Management Systems
    - Data Warehouses
    - Database Management Systems
    - Decision Support Systems
    - Digital Libraries
    - Distributed, Parallel Systems, and Interoperability
    - Geographic Information Systems (GIS)
    - Open Systems
    - Performance Evaluation and Benchmarking
    - Remote Sensing and Multimedia Database Systems
    - Sensor Networks and Mobility
    - Simulations
    - Wireless and Ad hoc Networks
7. Applications
    - Cartography
    - Earth Sciences, Astronomy
    - Emergency and Crisis Management
    - Environmental Monitoring
    - Global Positioning and Location Detection
    - Geosciences
    - Impact Assessment
    - Location-based and Mobile Services
    - Medical Imagery and Atlases
    - Navigation and Route Planning
    - Phenomena Detection and Tracking
    - Public Safety and Homeland Security
    - Real-time Applications
    - Telecommunications
    - Traffic and Transportation
    - Urban Planning and Management
    - Utilities Management
    - Web-based Applications
    - ….
8. Spatial Information and Society
    - Data Sharing, Privacy, and Security
    - Economic Aspects
    - Education and Curriculum Development
    - Electronic Government
    - Ethical Aspects
    - Institutional and Inter-institutional Aspects
    - Legal Aspects
    - Standards and Technology Transfer

3. Primary audience/primary need to be served:

SIGSPATIAL addresses research and education issues related to handling spatial information in many disciplines including Computer Science and Engineering, Geographic Information Sciences (GIS), Mathematics, and Statistics.

SIGSPATIAL addresses crucial needs of several national and international agencies, e.g., The National Science Foundation (NSF), The National Geospatial-Intelligence Agency (NGA), The National Institute of Health (NIH), The Army Topographic Engineering Center (TEC), Army Resources Laboratory (ARL), National Aeronautics and Space Administration (NASA), U.S. Geological Survey (USGS), Census Bureau, U.S. Department of Transportation (USDOT), National Oceanic and Atmospheric Administration (NOAA), Housing and Urban Development (HUD), Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), The Natural Resources Canada (NRCan), The Mexican National Institute of Statistics, Geography and Informatics (INEGI), the U.K. Ordinance Survey, French National Geographic Institute (IGN), Swiss Federal Office of Topography (SwissTopo), etc.

Issues addressed by SIGSPATIAL are becoming increasingly important in the marketplace as can be seen by recent developments in numerous consumer services such as the rapidly growing mobile commerce and location-based services by cell phone makers, in-car navigation products by car companies, and emergency transportation routing services by healthcare industries. The business sector is acknowledging the high demand for spatial information by its presence in application products of companies such as Autodesk, Bentley, ESRI ArcGIS, GE Energy, Google Earth, IBM DB2/Spatial Extender, Intergraph, MapInfo, Microsoft Virtual Earth, NAVTEQ's Maps, Oracle Spatial, and 1Spatial,to name a few.

Results of SIGSPATIAL-related research are of interest to both practitioners and academics. In the case of practitioners, for example, ESRI, the maker of the most popular geographic information system, holds an annual meeting for their users where new developments including applications of new research results are discussed. In the past year attendance at the meeting surpassed 14,000 with 13,000 users and practitioners from 124 different countries as well as over 1000 ESRI employees.

In the case of academics, a number of technical conferences exist. For example, in the case of the ACM International Symposium on Geographic Information Systems (ACM GIS), the flagship conference of the field, this years edition (the 15th in an ongoing series first started in 1993) featured 37 full papers and 29 poster papers selected from 129 submissions with over 185 attendees and with over 40% of the participation coming from outside of academia. The closely related 10th International Symposium on Spatial and Temporal Databases (SSTD) accepted 26 papers from 76 submissions this year. In the previous year, the 14th ACM International Symposium on Geographic Information Systems (ACM GIS) featured 30 papers chosen from 90 submissions. In September 2006, the 4th GIScience biannual conference had 26 papers chosen from 93 submissions.

Within the same conference, extended abstracts were also requested and from 159 additional submissions, 42 were selected for oral presentations and 46 were selected for poster presentation. A total of 350 people were in attendance, which was an all time record for the conference.

There are a number of other conferences on spatial data handling including the meeting of the Association of American Geographers (AAG), the International Symposium on Web and Wireless Geographical Information System (W2GIS), the International Symposium on Spatial Data Handling (SDH), the Conference on Spatial Information Theory (COSIT), the International Symposium on Temporal Representation and Reasoning (TIME), the International Workshop on Spatial and Spatio-temporal Data Mining (SSTDM), the International Workshop on Spatio-Temporal Database Management (STDBM), the International Workshop on Semantic and Conceptual Issues in Geographic Information Systems (SeCoGIS), GeoInformatics, the International Workshop on Context-Aware Mobile Systems, the Workshop on Geographical Information Retrieval, the AGILE International Conference on Geographic Information Science, the International Workshop on Semantic-based Geographical Information Systems (SeBGIS), the International Conference on Geospatial Semantics (GeoS), and the International Symposium on Spatial Data Quality.

The above activities reflecting academic, industrial, government, and consumer interests are a clear indicator for the need to establish the ACM Special Interest Group on Spatial Information (SIGSPATIAL).

4. Initial activity to be undertaken by the group (publication, conferences, workshop, etc.):

- Sponsoring an annual international conference on spatial information (The ACM SIGSPATIAL Conference) that will broaden the scope of the existing ACM Symposium on GIS (ACM-GIS), and initiate new affiliated workshops along with the conference, e.g., a workshop on Mobile Computing Systems and Applications, and another workshop on Spatial and Spatiotemporal Data Mining, for a start. Upon the initiation of this SIG, the ACM-GIS symposium will be renamed to be the ACM SIGSPATIAL conference and will serve as the flagship conference of the field. This symposium has a long history havig been held on an annual basis since 1993 and having attracted over 185 attendees in the most recent year. Other independent workshops or conferences can be co-sponsored or held in cooperation with SIGSPATIAL.

- Initiating a high-quality journal (e.g., ACM Transactions on Spatial Information) to publish related research papers, special issues on selected topics, invited, and expanded papers from sponsored events.

Recognition of achievements in the field through the flagship conference's best paper award, as well as the initiation of additional awards, as is appropriate, such as a

SIGSPATIAL innovation award, SIGSPATIAL contribution award, and a dissertation award.

- Maintaining an archive of related PhD theses.

- Providing for better interaction between the industrial community and researchers (e.g., by attracting sponsorships from companies, setting up company-specific activities, and connecting students and companies for internship opportunities).

- Co-sponsoring related conferences and workshops jointly with other SIGs, e.g., Artificial Intelligence (SIGART), Computer-Human Interaction (SIGCHI), Computer Science Education (SIGCSE), Computer Graphics and Interactive Techniques (SIGGRAPH), Information Retrieval (SIGIR), Knowledge Discovery in Data (SIGKDD), Measurement and Evaluation (SIGMETRICS), Management Information Systems (SIGMIS), Multimedia (SIGMM), and Management of Data (SIGMOD).

- Promoting student memberships through special membership and conference registration rates, assistance in job interviews, establishing a Ph.D. workshop for Ph.D. students to get visibility, exposure, and feedback on their research from experts in the field, and maintaining a job bank through industrial and governmental sponsors. ACM SIGSPATIAL will attract students from, including but not limited to, the following fields of study: Computer Science and Engineering, Geography, Geology, Statistics, Civil Engineering (transportation research, urban planning), Environmental Engineering, Management and Information Systems, and Natural Resources Management.

5. Overlap issues with other ACM SIGs:

There are a number of SIGs where spatial information will play or is playing a significant role. As such, we believe there are potential opportunities for cooperation, co-sponsorship, or other interaction with SIGSPATIAL that may be interesting. The intellectual ties are briefly explored in the listing below, although the list is not exhaustive:

- **Knowledge Discovery in Data** (SIGKDD)
    - Spatial pattern discovery
    - Similarity search and approximate matching
    - Spatial data mining

- **Management of Data** (SIGMOD)
    - Spatial data integration
    - Spatial data interoperability
    - Spatial data storage and indexing
    - Spatial query processing and optimization

- **Measurement and Evaluation** (SIGMETRICS)
    - Performance of Spatial Indexing Methods
    - Measurement of Location-Based Services

- **Computer-Human Interaction** (SIGCHI)
    - User interface design
    - Spatial data visualization
    - Visual and gesture languages

- **Computer Graphics and Interactive Techniques** (SIGGRAPH)
    - Virtual and immersive environments
    - Multimedia for GIS
    - 3D visualization
    - Carto project

- **Information Retrieval** (SIGIR)
    - Spatial information extraction
    - Spatial indexing
    - Spatial search
    - Spatio-textual search

- **Data Communication** (SIGCOMM)
    - Sensor networks
    - Wireless and ad hoc networks

- **Mobility of Systems, Users, Data and Computing** (SIGMOBILE)
    - Global positioning and location detection
    - Location-based and mobile services

- **Multimedia** (SIGMM)
    - Multimedia for GIS
    - Visualization and virtual environments
    - Image and multimedia databases

No doubt, other opportunities exist for cooperation between SIGSPATIAL and SIGs that have not been mentioned, and the list above is not intended to preclude such interaction. By its nature, spatial information handling is strongly interdisciplinary, and members of many different SIGs are already counted among our expected SIGSPATIAL attendees. No doubt, these individuals will act as ambassadors to other SIGs, seeking cooperation, cross-listing, and synergy whenever it is at all appropriate.

References

1. R. R. E. Chorley, *Handling of Geographic Information. Report of the Committee of Enquiry,* chaired by Lord Chorley, London, Her Majesty's Stationary Office (Department of the Environment), 1987.

2. A. Haque, Information technology, *GIS and democratic values: ethical implications for IT professionals in public service,* Ethics and Information Technology (ACM), 2003.

3. D. Koller, P. Lindstrom, W. Ribarsky, L. F. Hodges, N. Faust, and G. Turner, *Virtual GIS: a real-Time 3D geographic information system*, Proceedings of the 6th Annual IEEE Conference on Visualization, Atlanta, GA, 1995, pp. 94-100.

4. F. McKee, *The Importance of GIS in modern society and the effective partnering of education and industry*, Proceedings of the 5th AGILE Conference on Geographic Information Science, 2002

5. Z. R. Peng and M. Tsou, *Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks*, John Wiley and Sons, New York, 2003

6. M. F. Vine, D. Degnan, and C. Hanchette, *Geographic Information Systems: their use in environmental epidemiologic research*, Environmental Health Perspectives, 105(6): 598–605, June 1997.

7. S. Shekhar and S. Chawla, *Spatial Databases: A Tour,* Prentice Hall, Englewood-Cliffs, NJ, 2003.

8. H. Samet, *Foundations of Multidimensional and Metric Data Structures*, Morgan Kaufmann, San Francisco, 2006.

9. P. Rigaux, M. Scholl, and A. Voisard, *Spatial Databases with Application to GIS,* Morgan Kaufmann, San Francisco, 2002.

10. R. H. Güting and M. Schneider, *Moving Objects Databases,* Morgan Kaufmann, San Francisco, 2005.

11. J. Schiller and A. Voisard. *Location-Based Services*, Morgan Kaufmann, San Francisco, 2004.

12. M. de Berg, M. van Kreveld, M. Overmars, and O. Schwarzkopf, *Computational Geometry: Algorithms and Applications,* Second Edition, Springer-Verlag, Berlin, Germany, 2000.

13. H. Samet, *Applications of Spatial Data Structures: Computer Graphics, Image Processing, and GIS,* Addison-Wesley, Reading, MA, 1990.

14. H. Samet, *The Design and Analysis of Spatial Data Structures,* Addison-Wesley, Reading, MA, 1990.

15. R. Laurini and D. Thompson, *Fundamentals of Spatial Information Systems,* Academic Press, San Diego, 1992.

16. M. DeMers. *Fundamentals of Geographic Information Systems*, 3rd edition, Wiley, New York, 2005.

17. P. A. Longley, M. F. Goodchild, D. J. Maguire, and D. W. Rhind. *Geographic Information Systems and Sciences,* 2nd edition, Wiley, New York, 2005.

18. D. DiBiase, M. DeMers, A.Johnson, K. Kemp, A. Taylor Luck, B. Plewe, and E. Wentz (Editors), *Geographic Information Science and Technology Body of Knowledge*, Association of American Geographers, Washington DC, 2007.

19. M. F. Worboys and M. Duckham, *GIS: A Computing Perspective*, 2nd edition, CRC Press, Boca Raton, FL, 2006.

Organizing Committee:

Hanan Samet, University of Maryland, USA, (member of ACM GIS Steering Committee and 2007 Conference Co-General Chair)
Dr. Hanan Samet is a Professor of Computer Science at the University of Maryland where he leads a number of research projects on the use of hierarchical data structures for database applications involving multimedia data such as spatial and image databases. His research group has developed the SAND spatial browser, the VASCO system of JAVA applets for visualizing and animating spatial indexes (http://www.cs.umd.edu/~hjs/quadtree/index.html), and the MARCO system for map retrieval by content which enables pictorial queries on a symbolic image database system. He is the author of the recent book "Foundations of Multidimensional and Metric Data Structures" published by Morgan-Kaufmann, San Francisco, CA, 2006 (http://www.mkp.com/multidimensional), as well as the texts "Design and Analysis of Spatial Data Structures" and "Applications of Spatial Data Structures: Computer Graphics, Image Processing and GIS" published by Addison-Wesley, Reading, MA, 1990. He has a Ph.D. from Stanford University. He is a Fellow of the ACM, IEEE, and the International Association of Pattern Recognition (IAPR). For more details, see http://www.cs.umd.edu/~hjs.

Walid G. Aref, Purdue University, USA, (member of ACM GIS Steering Committee)
Dr.Walid G. Aref is a professor of computer science at Purdue. His research interests are in developing database technologies for emerging applications, e.g., spatial, spatio-temporal, multimedia, bioinformatics, and sensor databases. He is also interested in indexing, data mining, and geographic information systems (GIS). In 2001, he received the CAREER Award from the National Science Foundation and in 2004, he received a Purdue University Faculty Scholar award. Professor Aref is a member of Purdue's Discovery Park Bindley Bioscience and Cyber Centers. He is on the editorial board of the VLDB Journal and is a senior member of the IEEE. He served as the Program Committee Co-Chair of the ACM GIS Symposium on Geographic Information Systems in 2001.

Omar Boucelma, Université Aix-Marseille, France

Omar Boucelma is a Professor in Computer Science at the University Paul Cézanne, Marseille. He was also a research associate at CU Boulder, Colorado (1994-1995). He served as PC member for several ACM GIS symposia and was the co-chair of ACM GIS'2005. His research interests are in database management systems, information integration, GIS, and web-based information systems.

Rolf De By, ITC, Enschede, The Netherlands, (member of ACM GIS Steering Committee)
Dr. Ir. R.A. (Rolf) de By obtained his secondary school diploma ('Atheneum-B') in 1978, from Bonhoeffer College, with emphasis on mathematics, physics and foreign languages. Subsequently pursued an engineering (MSc.) degree ('ir.') in Applied Mathematics from Twente University with emphasis on discrete mathematics and computer science. His MSc topic was on the use of graphs to represent (causal) knowledge. He then worked as a research assistant at Computer Science department, Twente University, in the field of database design and later became an Assistant Professor in 1989. His PhD thesis was on the formal methods of database design in 1991. He then continued as an Assistant Professors with the same group, up until 1996 when he joined ITC (International Institute for Geo-Information Science and Earth Observation) as an Associate Professor in Spatial Information Theory and Applied Computer Science. He served as the Program Committee Co-Chair of the ACM GIS Symposium on Geographic Information Systems in 2006.

Isabel Cruz, University of Illinois at Chicago, USA, (member of ACM GIS Steering Committee)
Isabel Cruz holds a PhD in Computer Science from the University of Toronto. She is an Associate Professor in the Department of Computer Science at the University of Illinois at Chicago (UIC). She has been invited to give more than 50 talks worldwide and has more than 80 refereed publications in Databases, Semantic Web, Visual Languages, Graph Drawing, User Interfaces, Multimedia, Geographic Information Systems, Information Retrieval, and Security. She has received several awards for research, teaching, and service, including a National Science Foundation CAREER Award, the Teaching Recognition Program Award from the UIC Council for Excellence in Teaching and Learning, and the Association for Computing Machinery Recognition of Service Award. Her research has been funded since 1996 by grants from the National Science Foundation and from the Department of Defense. She has chaired the program committee of ten international conferences and workshops including the ACM GIS Symposium in 2004, the International Conference on GeoSpatial Semantics in 2005, and the International Semantic Web Conference in 2006, and edited several journals and books. She has served on more than one hundred program committees and on several steering and advisory committees, including the ACM GIS Symposium Steering Committee and the National Research Council's Mapping Science Committee of the National Academies.

A. Stewart Fotheringham, National University of Ireland, Ireland
A. Stewart Fotheringham is Science Foundation Ireland Research Professor and Director of the National Centre for Geocomputation at the National University of Ireland in Maynooth. He previously held positions at the University of Newcastle in the UK, the State University of New York at Buffalo, the University of Florida and Indiana University. He obtained his PhD and MA at McMaster University in Canada and his BSc

at Aberdeen University in Scotland. He has been actively involved with large GIS-based initiatives in the US, Canada, the UK and Ireland.

Professor Fotheringham's research interests include: the integration of spatial analysis and GIS; spatial statistics; exploratory spatial data analysis; and spatial modeling. His expertise is in the analysis of spatial data and in particular the local modeling of spatial relationships with geographically weighted regression, for which he has co-authored software that has been distributed to a wide variety of agencies and individuals concerned with spatial modeling. He is a founding editor of Transactions in GIS and is on a number of editorial boards. He has co-authored eight books, including Quantitative Geography: Perspectives on Spatial Data Analysis and Geographically Weighted Regression: An Analysis of Spatially Varying Relationships. He has also published over 20 book chapters and over 100 journal articles. He is a co-editor of the recently published 600+ page Handbook of Geographical Information Science published by Blackwell.

Professor Fotheringham has presented many keynote addresses at International Conferences and he has organized workshops on Geographically Weighted Regression in many countries Professor Fotheringham is a recipient of a $2.75 million award from Science Foundation Ireland and has held many other grants totaling in excess of $8 million. In addition he is the PI on a successful $10 million grant to establish a Strategic Research Cluster in Advanced Geotechnologies.

Ralf Hartmut Güting, University of Hagen, Germany
Ralf Hartmut Güting has been a full professor in Computer Science at the University of Hagen, Germany, since 1989. He received his Diploma and Dr. rer. nat. degrees from the University of Dortmund in 1980 and 1983, respectively, and became a professor at that university in 1987. From 1981 until 1984 his main research area was Computational Geometry. After a one-year stay at the IBM Almaden Research Center in 1985, extensible and spatial database systems became his major research interests; more recently, also spatio-temporal or moving objects databases. He is an associate editor of the ACM Transactions on Database Systems and an editor of GeoInformatica. He has published two German text books on data structures and algorithms and on compilers, respectively, and an English text book on moving objects databases, as well as around sixty journal and conference articles. His group has built prototypes of extensible and spatio-temporal database systems, the Gral system and the SECONDO system.

Erik Hoel, ESRI, USA, (member of ACM GIS Steering Committee)
Erik Hoel is a lead developer at the Environmental Systems Research Institute (ESRI) in Redlands where he has worked for the past eleven years. He received his B.S. in Computer Science from the University of California at Berkeley, and graduated with a M.S. and Ph.D. in Computer Science from the University of Maryland at College Park in 1995 (dissertation advisor: Hanan Samet). At ESRI, he works in Software Development (Geodata Management Group), focusing on topics such as data models, networks, topology, temporal and moving object data, web-based GIS services, and software architectures. He has authored more than twenty papers and chapters in various international conferences, journals, and books. He is a member of the steering committee

of ACM-GIS and is a member of the editorial board of GeoInformatica. He was the co-program chair of ACM-GIS in 2003. He has also served on numerous conference program committees including ACM-GIS, SSTD, STDBM, INSS, CoMoGIS, and CIKM. He has been a reviewer for IEEE Internet Computing and TODS.

Ibrahim Kamel, University of Sharjah, United Arab Emirates
Dr. Ibrahim Kamel obtained his Ph.D. in spatial data indexing from University of Maryland in 1994. Currently, he is an associate professor at the department of Electrical and Computer Engineering at University of Sharjah, UAE. Previously, Dr. Kamel was a Lead scientist Panasonic Research Labs in Princeton, NJ, USA, where he was managing several projects including Multimedia retrieval, Smart Homes, Voice Over IP. His research interests include spatial and temporal indexing, multimedia information retrieval, computer and Internet security, and smart appliances. He has 21 patents in information storage and retrieval. He has published more than sixty papers in international conferences and journals. He co-chaired several international workshops including the International Workshop on Multimedia Information Retrieval 2000 and the International workshop on Mining Spatial and Temporal Data 2001. Dr. Kamel serves as an associate editor for several International journals. He has participated in numerous program committees and has served in the Industrial advisory committee for the Department of Electrical and Computer Engineering, University of Miami and the Center for Advanced Information Processing (CAIP), Rutgers University.

Robert Laurini, INSA of Lyon, France, (Chair of ACM GIS Steering Committee)
Dr. Laurini is full distinguished professor at the Computing Department of the National Institute for Applied Sciences (INSA). Previously, he carried out research at the University of Cambridge, Martin Center for Architectural and Urban Systems, UK (1976-1977) and at the University of Maryland (Center for Automation Research, USA) (1986-1987). For five years, he was head of the Laboratory for Information System Engineering (LISI), co-located at the National Institute for Applied Sciences (INSA) and Claude Bernard University of Lyon, France. From 2001 to 2004, he was head of SIGMA / CASSINI, the French CNRS Federation on Geographic Information Systems. He was deputy head of the LIRIS Research Center for Images and Information Systems from January 2003 to December 2006. He was vice-president of the INSA Board of Regents from November 2002 to November 2006. In November 1998, he received an ACM award for Technical Contributions and Leadership. He served as the Program Committee Co-Program Chair of the ACM GIS Symposium on Geographic Information Systems in 1998. He is chairman of the ACM GIS Symposium steering committee. He is the co-author with D. Thompson of the text "Fundamentals of Spatial Information Systems" published by Academic Press in 1992.

Ki Joune Li, Pusan National University, South Korea, (member of ACM GIS Steering Committee)
Dr. Ki Joune Li is an Associate Professor of Computer Science at the Pusan National University, South Korea and holds a joint appointment with the Department of Geographic Information Systems, Pusan National University, South Korea. He obtained B.Sc. and M.Sc degrees from the Seoul National University, S. Korea and a Ph.D. from

INSA de Lyon, France. His main research interests are in Spatial and Spatio-Temporal Databases and the study of Geographical Information Systems. Dr. Li serves as the Director of Computer Science Department at Pusan National University and is a member of the National GIS Counseling Committee. He served as the Co-Program Chair of ACM-GIS in 2001.

Chang-Tien Lu, Virginia Tech, USA
Chang-Tien (C.T.) Lu received the MS degree in Computer Science from the Georgia Institute of Technology, Atlanta, GA, in 1996, and the Ph.D. degree in Computer Science from the University of Minnesota, Minneapolis, MN, in 2001. He is currently an assistant professor in the Department of Computer Science at Virginia Polytechnic Institute and State University, and is the founding director of the Spatial Lab. He is also affiliated with the Virginia Tech Civil and Environmental Engineering Department, Center for Geospatial Information Technology, and Virginia Tech Transportation Institute. He has served as the co-program chair for the 2006 IEEE International Conference on Tools with Artificial Intelligence and the 2007 IEEE International Workshop on Spatial and Spatial-temporal Data Mining, and as publicity chair for the ACM-GIS in 2007. Dr. Lu's research focuses on emerging requirements for storing, analyzing, exchanging, visualizing, and disseminating spatial (and spatio-temporal) data in geospatial applications. His research group has developed several web-based spatial analysis and visualization systems for managing and mining various kinds of geospatial information. Specific projects include discovering spatial anomalies, identifying recurrent or unexpected events, and predicting future trends. His research projects have been sponsored by the Department of Defense, Virginia Department of Transportation, and Virginia Transportation Research Council.

Duane Marble, Ohio State University, USA
Duane Marble received a Ph.D. in Geography from the University of Washington after which he served on the faculties of the University of Pennsylvania, Northwestern University, the State University of New York at Buffalo, and the Ohio State University in Columbus, Ohio where he is currently a Professor Emeritus. At the State University of New York at Buffalo Dr. Marble established the Geographic Information Systems Laboratory which was the first formal university research unit dealing with GIS, as well as the first formal graduate program in Geography providing a specialization in GIS. Over fifty graduate students completed this program and today many of these now hold senior positions in the GIS industry. While at SUNY at Buffalo, he also held an appointment in the Department of Computer Science.

In 1982 Dr. Marble became Chairman of the Commission on Geographical Data Sensing and Processing of the International Geographical Union and established the International Symposia on Spatial Data Handling which for many years became the premier scientific meetings in the GIS area. Subsequently, Dr. Marble also served as Chair of the IGU Working Group on Global Space-Time Databases. At the Ohio State University Dr. Marble and his associates created the OSU MAP-for-the-PC which was given a Best Software award by the Microcomputer Specialty Group of the Association of American

Geographers in 1990. This teaching software in now in use by over three hundred universities; one-third of them outside of North America.

In 1993 Dr. Marble received an Honors Award from the Association of American Geographers for "his seminal work in quantitative techniques, transportation geography, computer modeling and simulation, and for pioneering research in geographic information systems". In 2007 Dr. Marble was awarded the UCGIS Educator Award.

Mohamed Mokbel, University of Minnesota, USA
Mohamed F. Mokbel (Ph.D., Purdue University, 2005, MS, B.Sc., Alexandria University, 1999, 1996) is an assistant professor in the Department of Computer Science and Engineering, University of Minnesota. His main research interests focus on advancing the state of the art in the design and implementation of database engines to cope with the requirements of emerging applications (e.g., location-aware applications and sensor networks). Mohamed is the co-chair of the first and second workshops on privacy-aware location-based mobile services, PALMS, 2007 (Mannheim, Germany) and 2008 (Beijing, China). He has also delivered four international tutorials about location-based applications and location privacy in ACM CCS, EDBT, and MDM conferences. Dr. Mokbel is actively publishing in major database conferences (VLDB, SIGMOD, and ICDE) as well as spatial database conferences (ACM-GIS and SSTD). Two of his papers have been invited for publication in a special issue of the GeoInformatica journal devoted to the best papers of ACM-GIS in 2002 and the International workshop on spatio-temporal database management system (STDBM 2004). He has served in several program committees that include IEEE ICDE, ACM-GIS, SSTD, and SSDBM conferences and is a regular reviewer for major journals that include IEEE TKDS, GeoInformatica, and International Journal of GIS. He has spent the summers of 2002, 2004, and 2006 at Lawrence Livermore National Lab, Microsoft Research, and Hong Kong Polytechnic University, respectively. He is a member of ACM and IEEE.

Silvia Nittel, University of Maine, USA (member of ACM GIS Steering Committee)
Dr. Silvia Nittel is an Associate Professor with the Department of Spatial Information Science and Engineering at the University of Maine, and a research faculty with the NSF-funded National Center for Geographic Information and Analysis (NCGIA). She has obtained her Dipl-Inf. (equivalent to a M.S.) at the University of Erlangen-Nuernberg in Computer Science, and her doctorate in Computer Science at the University of Zurich, where she specialized in database system architectures for non-traditional applications. Upon graduation, she joined the Computer Science Department of the University of California, Los Angeles in 1995, and was the lead of the UCLA Data Mining Laboratory where she worked on high performance data mining tools for knowledge extraction of satellite data sets, and focused on heterogeneous data integration and interoperability issues for spatial data.

After UCLA, she joined the University of Maine in September 2001 where she now focuses on temporal-spatial database management systems for stationary and mobile ad-hoc sensor networks. Her research interests are in the area of data stream-based mining of massive spatial data sets, and adaptive, resource-constrained query processing within sensor networks, and spatio-temporal data streams. In her research, she has published

over 35 refereed papers and articles in the research areas mentioned above, and received an NSF CAREER award in 2005.

In 2003, she was the Co-General and Program Chair of the Scientific and Statistical Database System Conference 2003 (SSDBM). In 2003 and 2006, Dr. Nittel was the Co-Organizer of the First and Second NSF-Sponsored "Geosensor Networks" conferences in Portland, ME, and Boston, MA. In 2004, she is co-organized a workshop on "Location Privacy: Individual Autonomy as Driver of Design" together with Dr. Harlan Onsrud, and in 2007, she was the co-chair of the Mobile Data Management Workshop "Privacy-Aware Location-based Mobile Services" (PALMS). In 2006, Dr. Nittel served as the co-Program chair of ACM-GIS. Dr. Nittel has been invited as academic advisor to several NASA panels on strategic technology directions as well as NRC and National Science Board workshops. She has served on numerous program committees including VLDB 2007 and ICDE 2007 and 2008. She is an Executive Committee Member of the NSF IGERT "Sensor Science, Engineering and Informatics" at the University of Maine.

Dieter Pfoser, CTI, Greece, (member of ACM GIS Steering Committee)
Dr. Dieter Pfoser received his Ph.D. degree in computer science from Aalborg University, Denmark, in 2000 and his diploma degree in business information systems from the Johannes Kepler University in Linz, Austria in 1996. He is a researcher and leader of the Data and Knowledge Engineering Group (http://dke.cti.gr) at the Research Academic Computer Technology Institute in Athens, Greece. Previously, he was a research assistant with the National Center for Geographic Information and Analysis (NCGIA) and the Department of Spatial Information Science, both University of Maine, USA (1996-1997) as well as a Ph.D. student (1997-2000) and an assistant professor (2000-2002) at the Department of Computer Science, Aalborg University, Denmark.

His areas of expertise include geographic information systems, spatiotemporal databases, traffic telematics, and mobile databases. He has co-authored more than 30 scientific papers in conference proceedings, journal papers and book chapters. He has served on numerous program committees and was the co-Program chair of ACM-GIS in and was also the demonstration chair of the 8th Conference on Mobile Data Management (MDM '07). He has also served as a project evaluator and proposal reviewer for the European Commission, the Swiss National Science Foundation and the National Science Foundation.

His research has been supported by several grants from the Austrian Ministry of Education, the Greek Secretariat of Research and Technology and the European Commission. Current research projects include CITER – Creation of a European History Textbook Repository (http://citer.cti.gr) and TRACK&TRADE – A Data Mart for Floating Car Data (http://www.trackandtrade.org).

Philippe Rigaux, CNAM, France (member of ACM GIS Steering Committee)
Philippe Rigaux is Professor of Computer Science at the University Paris-Dauphine since September 2004. He obtained his PhD in Computer Science in 1995 from the Conservatoire National des Arts et Métiers, and the "Habilitation à diriger des recherches" in 2002 from the University Paris 11-Orsay (France). Philippe Rigaux

directed 4 PhD students, and participated to the ESPRIT, CHOROCHRONOS and SELENE European project, and to the DELOS European Networks of Excellence. He is author or co-author of 6 books, fifty international publications in international journals and conferences, including the book "Spatial Databases", co-authored with M. Scholl and A. Voisard and published in 2001 by Morgan Kaufmann. He has conducted research in the area of database management, strongly oriented toward spatial applications. His research interests include the design of query languages and query evaluation techniques, multidimensional databases, including distributed indexing, and data intensive applications. He has served as the co-program chair for ACM-GIS in 2003 and has been involved in the program committee of various conferences in the field, such as SSD, SSDBM, VLDB, ACM-GIS, etc.

Markus Schneider, University of Florida, USA, (2007 ACM GIS Conference Program Chair)
Markus Schneider is an Assistant Professor at the Department of Computer and Information Science and Engineering at the University of Florida. He has a Ph.D. in Computer Science from the University of Hagen, Germany. He is the co-author of the book "Moving Objects Databases", published by Morgan-Kaufmann in 2005 as well as two other books in this field. His research interests include spatial databases, spatio-temporal and moving objects databases, GIS, applied computational geometry, and extensible databases. He is on the editorial board of GeoInformatica and a recipient of the 2004 National Science Foundation CAREER Award. For more details, see http://www.cise.ufl.edu/~mschneid.

Cyrus Shahabi, University of Southern California, USA, (member of ACM GIS Steering Committee, 2007 Conference Co-General Chair)
Cyrus Shahabi is currently an Associate Professor and the Director of the Information Laboratory (InfoLAB) at the Computer Science Department and also a Research Area Director at the NSF's Integrated Media Systems Center (IMSC) at the University of Southern California. He received his B.S. in Computer Engineering from Sharif University of Technology in 1989 and then his M.S. and Ph.D. degrees in Computer Science from the University of Southern California in May 1993 and August 1996, respectively. He is the author of two books and more than one hundred articles, book chapters, and conference papers in the areas of databases, GIS and multimedia. Dr. Shahabi's current research interests include Geospatial and Multidimensional Data Analysis, Peer-to-Peer Systems and Streaming Architectures. He is currently an associate editor of the IEEE Transactions on Parallel and Distributed Systems (TPDS) and is on the editorial board of ACM Computers in Entertainment magazine. He is also a member of the steering committees of IEEE NetDB and ACM GIS. He serves on many conference program committees such as ACM SIGKDD 2006-7, IEEE ICDE 2006-7, ACM CIKM 2005, SSTD 2005-7 and ACM SIGMOD 2004. Dr. Shahabi is the recipient of the 2002 National Science Foundation CAREER Award and 2003 Presidential Early Career Awards for Scientists and Engineers (PECASE).

Shashi Shekhar, University of Minnesota, USA, (member of ACM GIS Steering Committee)
Shashi Shekhar is a McKnight Distinguished University Professor at the University of Minnesota, Minneapolis, MN, USA. He was elected an IEEE fellow and received the IEEE Technical Achievement Award for contributions to spatial database storage

methods, data mining, and geographic information systems (GIS). He is serving as a co-Editor-in-Chief of GeoInformatica: An International Journal on Advances in Computer Sc. for GIS (ISSN 1384-6175) as well as of the Encyclopedia of GIS (in progress). He served on two committees of the National Research Council National Academy of Sciences, namely, the committee on mapping sciences (2004-2010) and the committee to review the basic and applied research at National Geo-spatial Intelligence Agency (2005). He has served as a member of the Board of Directors of University Consortium on GIS (2003-2004), a member of the editorial boards of IEEE Transactions on Knowledge and Data Engineering, a member of the IEEE-CS Computer Science \& Engineering Practice Board, a program co-chair of ACM-GIS in 1996, and a technical advisor to United Nations Development Program (UNDP), Environmental Systems Research Institute (ESRI), and other organizations. His research projects have been sponsored by the NSF, NASA, Army Research Laboratories, USDOT, FHWA, MN/DoT etc. He is the co-author of the book "Spatial Databases: A Tour" published by Prentice Hall in 2003, which has been translated into two foreign languages. He has published over 200 research papers in peer-reviewed journals, books, and conferences, and workshops. He received a Ph.D. degree in Computer Science from the University of California (Berkeley, CA). More details are available from http://www.cs.umn.edu/~shekhar.

Kentaro Toyama, Microsoft Research, India, (2007 ACM GIS Conference Local Arrangements Chair)
Kentaro Toyama is assistant managing director of Microsoft Research India, in Bangalore. He heads a group that conducts research to identify applications of computing technology international development, and is currently also the acting manager for the Digital Geographics research group. From 1997 to 2004, he was at Microsoft Research in Redmond, where he did research in computer vision and multimedia. The World Wide Media eXchange (http://wwmx.org), a project he led during this time, became internationally known in mapping circles as a novel photo-and-map website. Kentaro graduated from Harvard with a bachelor's degree in physics and from Yale with a PhD in computer science.

Agnes Voisard, Fraunhofer ISST and FU Berlin, Germany, (member of ACM GIS Steering Committee)
Prof. Agnès Voisard received her Master's and Ph.D. degrees in computer science from the University of Paris at Orsay (Paris XI) and INRIA (French Institut National Recherche en Informatique et en Automatique) in 1989 and 1992, respectively. During the academic year 1991-92 she was a research assistant in the database group of the Conservatoire National des Arts et Métiers (CNAM) in Paris. In 1992-93 she was an INRIA postdoctoral fellow at Ludwig-Maximilian Universität in Munich. In 1993, she was appointed Assistant Professor of Computer Science at the Free University of Berlin, where she obtained her "Habilitation" in 1999. Between January and June 2001, she was system architect at Kivera, Inc. (Oakland, California), a startup designing navigation systems.

Presently, she is heading of the Location-based Services department at the Fraunhofer Institut for Systems and Software Engineering (ISST) in Berlin as well as an adjunct faculty member at the Free University of Berlin, Institut for Computer Science. Her areas of expertise include geographic information systems, spatial data modeling, location-

based services, and interoperability in information systems. She has participated in several program committees, was general chair of the 5th International Symposium on Spatial Databases (SSD'97) and was co-program chair of ACM-GIS in 2002. She is a co-author with Philippe Rigaux and Michel Scholl of the book "Spatial Databases - with Application to GIS", published by Morgan Kaufmann in 2001. She also co-edited with Jochen Schiller the book "Location-based Services" published by Morgan Kaufmann in 2004.

Ouri Wolfson, University of Illinois at Chicago, USA
Ouri Wolfson's main research interests are in database systems, distributed systems, and mobile/pervasive computing. He received his B.A. degree in mathematics, and his Ph.D. degree in computer science from Courant Institute of Mathematical Sciences, New York University. He is currently the Richard and Loan Hill Professor of Computer Science at the University of Illinois at Chicago, where he directs the Databases and Mobile Computing Laboratory, and the newly established Mobile Information Systems Research Center. He is also an Affiliate Professor in the Department of Computer Science at the University of Illinois at Urbana Champaign. He has served as a consultant to Argonne National Laboratory, to the US Army Research Laboratories, and to the Center of Excellence in Space Data and Information Sciences at NASA. He is the founder of Mobitrac, a high-tech startup specializing in advanced fleet management software which has about forty employees in Chicago and lists major companies such as Fedex among its clients. Most recently he founded Pirouette Software Inc., and currently serves as its President. The company specializes in Mobile Peer-to-Peer software for local search. Before joining the University of Illinois he has been on the computer science faculty at the Technion and Columbia University, and has been a Member of Technical Staff at Bell Laboratories.

Prof. Wolfson has authored over 140 publications, and holds six patents. He is a Fellow of the Association of Computing Machinery, and serves on the editorial boards of the IEEE Transactions on Mobile Computing, the ACM/URSI/Baltzer Wireless Networks Journal, and the ACM SIGMOD Digital Review. He received the best paper award for "Opportunistic Resource Exchange in Inter-vehicle Ad Hoc Networks", at the 2004 Mobile Data Management Conference. He is the 2001 recipient of the UIC College of Engineering Faculty Research Award. He served as a Distinguished Lecturer for the Association of Computing Machinery during 2001-2003, and participated in numerous conferences as a keynote speaker, program committee chairman or member, tutorial presenter, session chairman, and panelist. Most recently he was the keynote speaker at the 5th International Workshop on Web and Wireless Geographical Information Systems (W2GIS 2005), the IEEE International Conference on Networking, Sensing and Control (ICNSC 2004), the Second International Workshop On Databases, Information Systems and Peer-to-Peer Computing (DBISP2P 2004), and the Second International Conference on Mobile Data Management (MDM 2001). He was the program committee co-chair of the Third International Conference on Mobile Data Management (MDM 2002), the Second ACM International Workshop on Mobile Commerce (2002), the Sixth International Conference on Mobile Data Management (MDM 2005), and the program committee vice-chair of the 22nd International Conference on Data Engineering (ICDE

2006). Presently, he is the Principal Investigator on a $3.1M NSF grant to establish a Ph.D. program in the new discipline of Computational Transportation Science.

Michael F. Worboys, University of Maine, USA
Michael F. Worboys is professor and chair of the Department of Spatial Information Science and Engineering, and a member of the National Center for Geographic Information and Analysis (NCGIA) at the University of Maine, USA. He is also a cooperating professor in the Department of Mathematics, and holds a professorial fellowship at the University of Melbourne, Australia. Until 2001, he was Professor of Computer Science and Director of the Geographic Information System Research Group at Keele University, England. He is the author of the text book "GIS: A Computing Perspective", published by Taylor and Francis as well as a co-author of the Second Edition with Matt Duckham published by CRC Press in 2004. He is on the editorial boards of the International Journal of GIS, Transa\ctions in GIS, Geoinformatica, and the Journal of Computers in Enviromental and Urban Systems. He is Convenor of the UK Research Working Group (WG3) of the National Geospatial Data Framework. He is an ACM Distinguished Scientist having been elected in 2006.