

Basic details

Name, title(s): **Siyka Zlatanova, Dr. Eng.**
Male/female: female

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Curriculum vitae

Personal details

Title(s), initial(s), first name, surname: Dr. Siyka Zlatanova
Date and place of birth: 4.10.1959, Sofia, Bulgaria
Nationality: Bulgaria, Netherlands

Master's

University/College of Higher Education: University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria
Date: 24.05.1983
Main subject: Geodesy and Photogrammetry

Doctorate

University/College of Higher Education: Graz University of Technology, Graz, Austria
Date: 15.03.2000
Supervisor ('Promotor'): prof. dr. dipl.-ing. Franz Leberl
Title of thesis: 3D GIS for urban development

Work experience since graduating

04.07 – now OTB Institute for Housing, Urban and Mobility Studies, Delft University of Technology, Delft, The Netherlands

Tenured Job title & Duties
Associate professor, Theme leader 'Geo-information for Disaster Management'

Research:

- GIS for Risk and DM
- Ontology for DM
- 2D/3D geoDBMS for risk and disaster management,
- integration of CAD and GIS

Supervision of:

- MSc students: Organisation of laser-scan in DBMS (ongoing), (ongoing), User requirements for GDI4DM (ongoing), Use of visuals in urban planning and restructuring of cities (ongoing).
- PhD students: Web-oriented 3D GIS (with UTM, Malaysia,

- ongoing), Developing quantification and data structure for accuracy and likelihood quantification of 3 and 4 D data (ongoing), Ontology for DM (ongoing), LBS for DM (ongoing)
 - Guest researchers: Extension of CityGML for underground features
 - Research assignments/case studies: LBS for pre-hospital care (case study with Intergraph and UTM, Malaysia)
- 01.04 – 03.07 OTB Institute for Housing, Urban and Mobility Studies, Delft University of Technology, Delft, The Netherlands
- Tenured Job title & Duties
Assistant-professor: 3D GIS, geoDBMS, Risk management
- Research:
- GIS for Risk and disaster management
 - 2D/3D geoDBMS for risk and disaster management,
 - integration of CAD and GIS
- Teaching: Lectures on 3D GIS and Spatial information of Utilities within MSc course TUD and Module 5 and Module 8 (GIMA), practicum 3D GIS (project 3rd year students).
- Supervision of:
- MSc students: Organisation of laser-scan in DBMS (ongoing), (ongoing), Integration of CAD and GIS data sets for wind simulation of buildings (ongoing)
 - PhD students: Web-oriented 3D GIS (with UTM, Malaysia, ongoing), Developing quantification and data structure for accuracy and likelihood quantification of 3 and 4 D data (ongoing)
 - Research assignments/case studies: LBS for pre-hospital care (case study with Intergraph and UTM, Malaysia)
- 01.04 – 01.05 OTB Institute for Housing, Urban and Mobility Studies, Delft University of Technology, Delft, The Netherlands
- Job title & Duties
PostDoc: 3D GIS, geoDBMS, Risk management
- Research:
- 3D modelling of large point clouds (case study with Bentley and the Faculty of L&R, TUD)
 - 2D/3D geoDBMS for risk and disaster management,
 - organization of multidimensional data in DBMS (project with AGI/RWS)
 - developing a concept model for Beherkaart-Nat (in a team project with AGI/RWS)
 - OpenGIS Web services (in a team, project with AGI/RWS and IONIC, Belgium)
- Teaching: lectures on 3D GIS and Spatial information of Utilities within MSc course TUD and Module 5 (GIMA), practicum 3D GIS (project 3rd year students).
- Supervision of:
- MSc students: Constraints in geo-information models (defended 2004), Database Storage of 3D freeform Curves and Surfaces (ongoing)
 - PhD students: Web-oriented 3D GIS (with UTM, Malaysia, ongoing)
 - Guest researchers: 3D GIS for utility management (China)
 - Research assignments/case studies: 3D model for indoor

- environments, LBS for pre-hospital care (case study with Intergraph and UTM, Malaysia), indoor scanning of the congress center of TUD (case study with Bentley and Leica)
- 08.02 – 12.03 OTB Institute for Housing, Urban and Mobility Studies, Delft University of Technology, Delft, The Netherlands
- fixed-term Job title & Duties
 PostDoc: 3D GIS,
 Research: 3D geoDBMS
 Teaching: lectures on 3D GIS (part of MSc course on geoDBMS)
- 02.00 – 07.02 Delft University of Technology, Department of Geodesy, Delft, The Netherlands
- fixed-term Job title & Duties
 PostDoc: 3D object reconstruction and database creation within the interfaculty project UbiCom.
 Research and development of 3D models for Augmented Reality application using DBMS (the first outdoor AR system).
- Developing a 3D data structure (maintaining 3D topology) and operators (functions and procedures in Oracle Spatial) for positioning and visualisation of virtual objects in support of augmented reality system,
 - Oracle Spatial 8, 9 – conversion between topology and geometry, developing functions for occlusion culling and back-face culling on a database level;
 - 3D visualisation and editing using Microstation GeoGraphics and Oracle Spatial 8i;
 - 3D GIS – concepts, models, spatial relationships, visualisation;
 - 3D reconstruction of building and terrain objects from different data sources (aerial and close-range imagery, laser data, GBKN, GPS);
 - Developing algorithms (C++, Khoros environment) for automatic 3D line extraction from multiple images.
- 12.95 - 11.99 The International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, The Netherlands
- fixed term Job title & Duties:
 PhD: 3D GIS for urban development,
- Designing system architecture for 3D GIS for web-based urban applications and developing a prototype;
 - Developing a conceptual model of a 3D GIS maintaining attributes, relationships (3D topology) and behaviour of objects in geometric and semantic domain;
 - Clarifying a method for detection of topological relationships in 3D;
 - Algorithms for a dynamic composition of Levels of Detail on the basis of a 3D R-tree;
 - Developing (in a team) a semiautomatic procedure for 3D object re-construction from aerial imagery. I was involved in supervising MSc students, extending and adapting (for UNIX and Windows) the experimental software.
- The proof of concepts and the data collection was completed using following systems and software: Web servers (Apache, WebSITE), RDBMS (MySQL, mSQL, Microsoft Access, PostgreSQL), rendering software (VRML, OpenGL), CAD (Microstation, AutoCAD, Medit, PioneerPro, 3D StudioMAX, Wavefront), GIS (ArcView, 3DAnalyst), digital

photogrammetric stations (TRASTER T10, SOCET SET), image processing software (ILWIS, Erdas, Adobe PhotoShop), programming languages (C, Perl, Javascript, Java, Pascal, Delphi), operating systems (Windows, Linux, UNIX).

Supervision of MSc students: 3D topographic data by aerial photogrammetry (1997), Semi-automatic 3D feature extraction and Digital photogrammetry for automatic photo-texture extraction (1997), Object-oriented roof model construction from skeletal point clouds: for building reconstruction (1998)

Teaching: 3D GIS (lectures and exercises) within 3D modeling module

12.89 – 12.99 UACEG, Faculty of Geodesy, Department of Surveying, Sofia, Bulgaria
Tenured
Job title & Duties
Chief Assistant-Professor,
Teaching:
Lectures on CAD and GIS systems, Organisation and management of geodetic works;

Practicals on: Geodetic networks and adjustment, Geodesy, Cadastre, Cadastre in Utilities, Urban planning.

Supervision MSc students: about 4 student per calendar year on different topics related to building, measurements and accuracy of geodetics networks

Research:

- Developing (in a team) a concept for the Cadastral and Land Registration System in Bulgaria. I was responsible for the identification and classification of cadastral objects.
- Investigating (in a team) a method for automated vectorisation of scanned maps (International project: 'Innovative computer aided interpretation of cadastral maps'). I was involved in testing and evaluating the experimental software.

1992 – 1995 Geotronics, Sofia
Job title & Duties
Founder and manager
More than 20 contracts related to the land restitution in Bulgaria. Some of the nature of the work involved:

- Set out, measurement and adjustment of geodetic networks;
- Large scale (1:500 - 1:5000) mapping of agricultural and urban areas applying surveying methods;
- Digitising maps and orthophoto images of agricultural areas;
- Surface modelling (vertical planning) for urban and civil engineering applications;
- Evaluation of agricultural land and small farms;
- Development of software for some of the activities (Pascal, AutoLISP);
- Consultancy.

09.84 - 12.89 The National Centre of Cadastre, Department of Applied Software, Sofia, Bulgaria.
Tenured
Job title & Duties
Software developer

Development

- Developing program routines with respect to the specific needs of the customers (Pascal and FORTRAN);
- Data collection for cadastral maps – geometry and attribute data;
- Maintenance of cadastral data – geometry and attribute data.

Brief summary of research over last five years:

My research is concentrated on techniques and algorithms for 3D automatic and semi-automatic reconstruction, 3D data structuring (with emphasis on 3D topology) and appropriate visualization.

My doctoral research was on 3D topological structures for urban environments. I proposed and tested a 3D topological model that gave advantages in 3D visualisation. In the period 2000-2002 (within the UBiCom) project, I could further develop, test and adapt it for the needs of an outdoor Augmented Reality Application. The model was implemented in Database Management System (DBMS). Such a solution (i.e. retrieving 3D spatial data from DBMS for real-time processing) was the first to be proposed worldwide. To be able to provide the needed 3D spatial data for such a model, several different data collection procedures (using different sensors) were investigated and tested. The gained experience, problems and suggested solutions on 3D data integration are reported in series of papers.

After 2002, my focus shifted to utilization of geoDBMS (3D geometry and topology models) for real-time applications. My research so far has shown both the advantages of 3D geo-information (compared to 2D) and the power of having geo-information organized in DBMS. The logical step then was to have the 3D geo-information, managed in DBMS in such a way to be able to be used by applications that require fast, intelligent, context-aware response for real-time decision-making.

In the last several years many tragic disasters (9/11, floods and fire in Europe, tsunami in East Asia) have directed my research toward systems for emergency response. On one hand risk and disaster management (especially in the response phase) is an area that needs urgent developments. On another hand disaster management in the response phase is a typical example of a system that needs a context-aware real-time system, which complies with my research and developments related to VR and AR systems. Therefore at the end of 2002 I started a wide discussion with several universities from Europe that resulted in two IP proposals submitted within the FP6. The proposals were not funded but were ranked within the best 10. The discussions and completed investigations allowed me to clarify current status and needs in risk management and set out a framework for wider utilization of 3D geo-information in the response phase. The significance of the framework was recognized by the ISPRS Council and a special working group Spatial data integration for emergency response was created (which I am chairing).

International activities

Invited visits and talks:

- Workshop 'Management and analysis of Information for Emergency response' at the Third Symposium on Gi4DM, 23 May, 2007, Toronto< Canada.
- Keynote talk at the First Conference on 3D GeoInfo, 7-8 August, 2006, Kuala Lumpur Malaysia
- July 2005, Summer school on GIS, Florence, Italy, within The Vespucci initiative, Workshop on 'Urban and Urgent Risk Management: U2RM', (with H. Scholten, A. Samara and M. Goodchild), <http://www.vespucci.org>
- Two Workshops on Disaster management within GIS planet, 1-2 July, Estoril, Portugal

- October 2004, UDMS 2004, Chioggia, Italy (workshop on 3D modelling), <http://www.udms.net>
- Flagis, June 2004, Gent, Belgium
- May 2004, Florida Atlantic University, Ford Lauderdale, Florida, USA (1 week invited visit, invited lecture)
- October 2003, University Technology of Malaysia (UTM), Johor Bahru, Malaysia (2 weeks series of invited visits)
- October 2002, UDMS 2002, Praag, Czech Republic, Workshop on '3D cadastres and 3D large-scale Urban modelling' (with Jantien Stoter)
- May, 2002, Fraunhofer Institute, Darmstadt, Germany (3 days invited lecture)
- November, 2001, Aalborg University, VR lab, (invited lecture)

International projects:

- Project 'Web-oriented 3D GIS' with UTM, Malaysia (supervision of a PhD student)
- Project '3D modelling of city of Venice', with University of Padua, Italy (20 000 euro, work in a team: advisory on 3D modelling, starting in 2006)

Other academic activities:

- Chair Working Group IV/8 'Spatial data integration for Emergency services', within Commission IV of the International Society for Photogrammetry and Remote Sensing (ISPRS) with Co-chair associate-prof. Jonathan Li, Ryerson University, Canada and Scientific Secretary prof. Andrea Fabri, Free University Amsterdam, The Netherlands
- Member of the Board of Urban Data Management Systems (UDMS)
- Programme Co-Chair of The First and Second International Symposium on Geoinformation for Disaster management', 21-23 March 2005, Netherlands, and 25-26 September, 2006 Goa, India
- Co-organised of the International Workshop on 3D Geoinformation, 7-8 August, 2006, Kuala Lumpur. Malaysia
- Co-organiser of the Joint ISPRS and DAGM workshop on Object Extraction for 3D City models and Traffic monitoring- concepts, algorithms and evaluation, August 2005, Vienna, Austria
- Programme Co-Chair of 'The International workshop on Service and Application of SDI', October, 2005 China, http://isprs-wg41.nsd.gov.cn/Hangzhou_index.htm
- Member of the Programme committee of the First International Workshop on Next Generation 3D City Models, June, 2005 Bonn, Germany, <http://www.ikg.uni-bonn.de/NextGen3dCity/>
- Main member of the organising committee of the research seminar within Bentley International User Conference, May, 2004, Orlando and May 2005 Baltimore, (responsible for the scientific content)
- Member of the Programme Committee of the Urban Data Management Symposia, October, 2004, Chioggia, Italy.
- Member of the Programme committee of the International Symposium and Exhibition on Geoinformation October 2003, Malaysia
- Member of the Organising committee of the E-mail seminar on Cartography, Bulgaria
- International honorary advisor of Geoinformation Science Journal, Malaysia
- Member of GIN
- Member of the Bulgarian Union for Surveyors and Land Managers
- Chair Geo Information Nederland (GIN)-middag '3D models and applications', 17 Dec 2003
- Member of the Scientific Examining Board for two PhD students (University of Liege, Belgium; University of Cape Town, South Africa)
- External examiner for MSc students, ITC, IHE, The Netherlands (about two MSc thesis per year on different topics)
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