

# NewsLetter



Issue No.1, Vol. 8 – June 2014

Interview with Prof. Dr. Jianya Gong

In Memoriam: Dr. Carolyn Merry

Data Mining and Spatial Data Mining

Research Experiments from Delft

# ISPRS SC Newsletter



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SC Newsletter is at a stage where getting broader and better demands more people to be involved in the process of it's formation. That's why SC Newsletter team is looking for the following volunteers:

- More **people who would be willing to prepare articles** for existing or new rubrics,
- Designers of Newsletter,
- **English native speakers** for proof reading.

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And also...

If you **would like to publish your research work** in the SC Newsletter send us your abstract on email written above. We will soon contact you for further information.

Dear ISPRS SC Newsletter readers,

Increasing number of students and researchers from all over the world is reading and following the publications of ISPRS-SC Newsletter since October 2007. It makes our team happy to see that SC is developing. Now we are proud of publishing the first issue of the 8th Volume.

We wish you joyfull reading of Newsletters new issue and a relaxing summer.

Enjoy your reading!  
SC Team

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Let's Come Together  
to Make The World  
Smaller and Smaller,  
While Enlarging  
and  
Powering Our  
Student Consortium  
Network!!

**JOIN US!!!**



## Interview

by Sheryl Rose Reyes

## Prof. Dr. Jianya Gong



Prof. Dr. Jianya Gong, has been active in ISPRS society from the beginning of 1990's and he is the president of the commission VI of ISPRS from July, 2012 to July, 2016. Prof. Gong has experienced several professional careers in different countries and now he is the director of 'State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing' at Wuhan University.

His research interests include geospatial data structure and data model, geospatial data integration and management, geographical information system software, geospatial data sharing and interoperability, Photogrammetry, GIS and remote sensing application.

### Can you give us a brief introduction regarding your professional career and current research interests?

I have been engaged in Geoinformatics since 1978, when I was enrolled into a four years' bachelor degree program of Surveying and Mapping in East China Geology College. After graduation, I worked in the college as a lecturer. One year later, I went Wuhan Technical University of Surveying and Mapping (WTUSM) for further education. At WTUSM (now incorporated into Wuhan University), I was luckily to be supervised by Prof. Wang Zhizhuo and Li Deren, renowned scientists of Geoinformatics in China even in the world. Under their encouragement and supervision, I began to pursue my Ph.D. on Photogrammetry and Remote Sensing. During my doctoral studies, I was sent to Technical University of Denmark to study under Professor Ole Jaecobi. Since my Ph.D. graduation, I have been working in Wuhan University. Nowadays, my research interests include GIS and Remote Sensing Application.

### As the local organiser of the 2014 Geoinformatics Summer Camp & 11th ISPRS Summer School and 5th ISPRS 3S-Summer Students Seminar, what were the challenges you encountered while preparing for this event since this a huge Summer School/Camp organized by a number of organizations and institutions?

Starting in 2011, the Geoinformatics Summer Camp, as a program of the graduate student exchange plat-

form sponsored by the Ministry of Education (MOE) of China and Academic Degrees Board of the National Council of China (ADBNCC), is held in Wuhan University every year for attracting the young students towards advanced studies and research in Geoinformatics. ISPRS Summer School, as we all know, is a good tradition started by the ISPRS Student Consortium in 2005. At the same time, the Summer Students Seminar (3S) is a collaborative program signed between SSGA (Novosibirsk), MIIGAIK (Moscow) and the Wuhan University and rotate between these three institutes. Holding these three events along together makes the preparation work very challenging. To make this summer school goes well, a lot of work were done by program coordinators. They had to keep contacting with different people in different organization and institutions.

### In your opinion, how important is the participation of students and young scientists/researches in international events?

As Gabriel García Márquez said in his book, One Hundred Years of Solitude, "Incredible things are happening in the world. Right there across the river there are all kinds of magical instruments", never shall we isolated ourselves from the rest of the world. Oth-

erwise, we will grow to be increasing solitary. Therefore, it is of great importance for students and young scientists/researchers to participate in international events. Apart from acquiring new knowledge, culture and nature experiences, it is an excellent opportunity for students and young researchers to meet highly esteemed scholars, young people from around the world and strengthen their networks.

### What do you think are the benefits of Summer Schools, Summer Students Seminar and other student-specific events to the youth and to the profession?

One of Commission VI's missions is to support, promote, and stimulate education and training at fundamental, advanced and professional levels. These events prompt the sharing of high-quality education resources, information and knowledge exchanges, and regional and international collaborations, and improve capabilities of students. The youth can broaden their vision by learning about interdisciplinary courses, and



prepare them well for future professional development by studying cutting-edge theory and technology on their research fields. In addition, they can network with each other, build friendship and grow together in their own scientific community.

**How important is collaboration among institutions in the field of remote sensing, photogrammetry and geospatial information sciences?**

As the proverb goes, “Two heads are better than one”. Collaboration among institutions in the field of remote sensing, photogrammetry and geospatial information sciences will make all partners stronger. Institutions can mutually reinforce their disciplinary constructions by sharing ideas, knowledge, effort, expertise, education resources and technical advantages with each other.

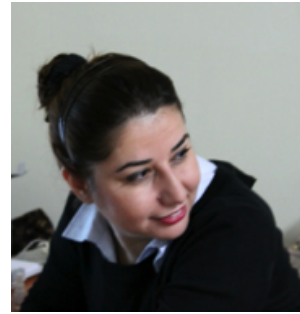
**What advice can you give to students and young professionals regarding a successful career?**

As far as I’m concerned, firstly, devotion to your major/research field is very important towards a successful career. Since a successful career requires years of hard work, you will find it difficult to insist on your research without dedication. Secondly, don’t pass up a chance to learn. To be productive, you need read as much as you can. To keep up with the latest development trend, you should never stop learning. Thirdly, communicate with others and take an open eye to the world. Effectively communication is beneficial to both your personal relationships and your academic career. For example, ISPRS summer schools provide a good opportunity for them to communicate with people from all over the world. Speak up and ask questions, exchange ideas with your supervisor, your fellow students and your friends. Through communication, you may receive feedbacks on your research, or you may get inspired by others’ thoughts.

*The End*

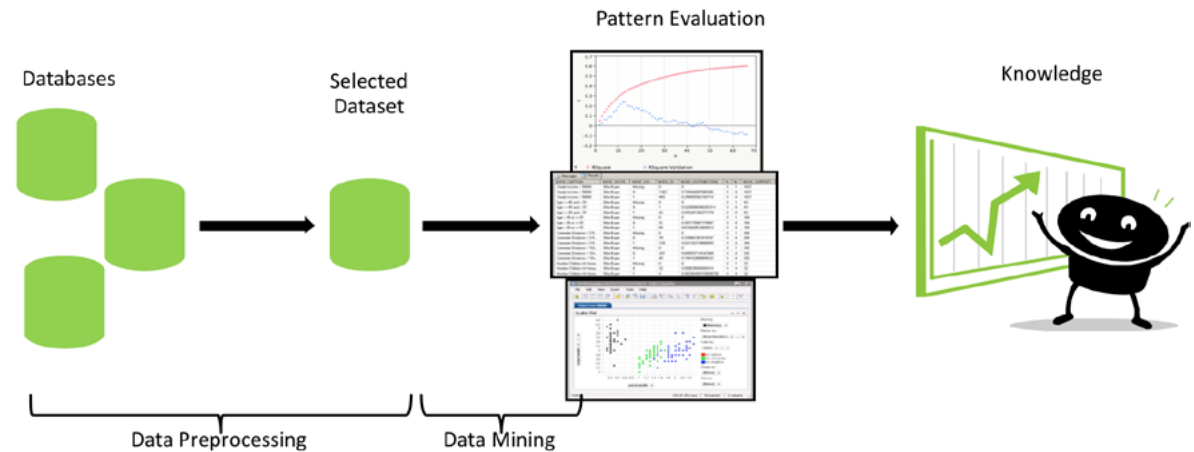
**Data Mining and Spatial Data Mining**

by Lütfiye KUŞAK



Since the 1960s, database systems and information technology have changed. While records were kept in a simple file system in the early years of the 1960s, today they are stored in complex and powerful databases. Due to developing technology, the properties of records (which are called data in the next sections of this article) have also changed. Nowadays, very different kinds of data are recorded in several sources such as databases, warehouses and web-based databases. We need more powerful data analysis tools to deal with the amount and different kinds of data; thus, data mining tools have been developed.

Data mining is a powerful technology which is used to analyze data from different perspectives. The data mining process can be compared to the search for gold because of the uncertainty of finding what you want and the valuable information which can be gained from the data stack. There are four steps in the process of knowledge discovery: data preprocessing; data mining; pattern evaluation; and knowledge presentation.



As shown in the above table, I conclude that software is being developed but not often; the number of general information papers is decreasing; however spatial data mining is regularly applied to all kinds of research. The graphic, which is presented above, was executed using the open source data mining software KNIME.

1. Data preprocessing

Before using data mining methods, preprocessing techniques such as transformation, cleaning, and

integration, can be applied to the data to improve the quality of result. Real world data is incomplete, noisy and inconsistent. Data cleaning is used to remove noise in the data. Data integration is applied to merge data from multiple sources. Normalization, where data are scaled in small specified range, aggregation and smoothing are examples of data transformation.

### 2. Data mining

After preprocessing, intelligent methods are applied to extract patterns from the data. Data mining can be separated into two main types: descriptive and predictive modeling. Descriptive models are created using clustering, association rules, sequential rules and trend analysis. Predictive models are created using classification and regression methods.

### 3. Pattern Evaluation

Pattern evaluation is an examination of the performance of data mining algorithms. If one model doesn't suit the project, it is changed to a new model.

### 4. Knowledge presentation

The results are visualized and interpreted.

Data mining analysis approaches have been adapted to many research needs, from medical search to marketing. Another possibility for application is spatial analysis. Spatial data mining can be formulated as:

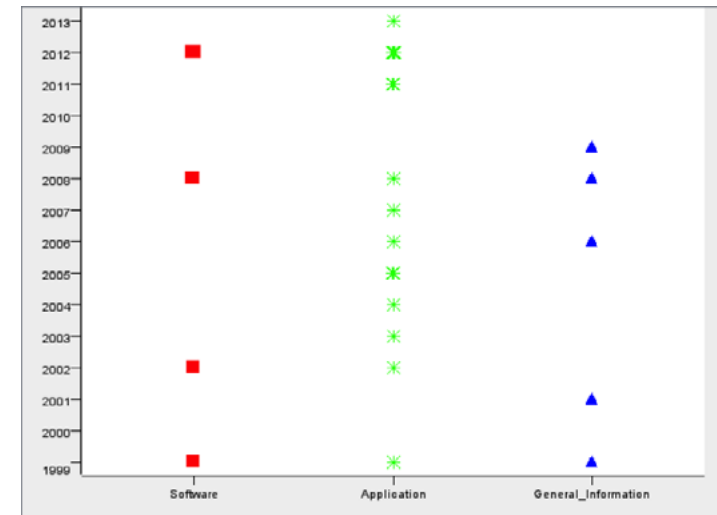
Data Mining + Geographic Information Systems = Spatial Data Mining

The difference between data mining and spatial data mining can be explained by those attributes or properties, which have to do with location and how location is influenced by other objects. In general, GIS is used for analyzing and presenting spatial data. GIS and data mining are different technologies. Each has its own visualization approaches and data analysis methods. Data mining has great potential benefits for GIS-based decision making. Public health services, environmental agencies, geo-marketing companies and governments can use this integrated technology.

The geographic data revolution is creating a new data formats beyond the traditional vector and raster formats. Imagery, i.e. geo-referenced multimedia, can be seen as a new type of data format. Geographic data mining methods can recognize complex geographic objects and their relationships. On the other hand GIS is not designed to deal with complicated data analysis. Spatial data mining methods can be applied to solve this problem. This solution will be helpful for understanding spatial and non-spatial data and their relationships in GIS, image processing, and

remote sensing. Examples of spatial data in GIS are location coordinates and area, while population and weather are examples of non-spatial data.

Thirty different papers on spatial data mining were randomly selected from 1999 to the present for this article. These papers fall into three main categories. The first group of papers covers general information about spatial data mining research where relationships between spatial data, data and database structure are discussed. The second group of research papers presents applications of spatial data mining in agriculture, landscape morphology, soil type, water quality, customer segmentation, traffic accident, crimes and demographic studies, and how they are useful in GIS analysis. Software is the final research focus; these papers emphasized the development of software, either to be used independently or as an integrated system within GIS.



As shown in the above graph, I conclude that software is being developed but not often; the number of general information papers is decreasing; however spatial data mining is regularly applied to all kinds of research. The graphic, which is presented above, was executed using the open source data mining software KNIME.

### [References](#)

## Research experiences from Delft, The Netherlands

by Dr. Saygin Abdikan



The Netherlands is famous not only for its beautiful historical cities, canals and tulips but also for its high level contribution to science. Delft University of Technology (TU Delft), established in 1842, is one of the oldest technical universities and has done many prestigious projects.

During my PhD research in the Geomatics Engineering Department at Yildiz Technical University in Turkey I studied synthetic aperture radar (SAR) interferometry monitoring of subsidence due to underground coal mining activities in Zonguldak Province, Turkey. Since it is the only hard coal reserve in Turkey though it is economically

important for the country. However, it was not an easy task to finish my research. My keen interest in radar interferometry combined with a lack of detailed studies and specialized researchers in my own country provoked me to seek other options around the world. Luckily, during my master's study I had attended a radar course given by Prof. Dr. Ramon Hanssen and his team in Ankara, Turkey, where I had a chance to meet with Dr. Hanssen. A few years later I reestablished my connection with him and applied for a scholarship with a research proposal.

I was awarded the Huygens Scholarship, which is administered by the Netherlands Organization for International Cooperation in Higher Education (NUFFIC). I have continued my research in the radar group of the Mathematical Geodesy and Position Section of the Aerospace Engineering Faculty. Lately the section has been moved to the Faculty of Civil Engineering and Geosciences and configured as the Department of Geoscience and Remote Sensing. It continues its research under three main themes - atmosphere, radar, and volcano and earthquake deformation (1).

As a guest researcher I had a great experience during my study in TU Delft. The people who were doing MSc and PhD work were very welcoming and helpful. They helped me very much to feel comfortable. I have learned about being a member of a group and also being competitive. I have also developed self-confidence, and being in an international group provided me with good communication skills. In addition to that, living in the Netherlands is also a memorable experience in my life. I like how life here is easy and people are so tolerant of each other. Delft is an old, historical city and if you want to explore the city having a bike is a good option. Almost everybody who lives in the Netherlands has a bike because it is the most common transportation vehicle. Every year many mobile students and researchers come to TU Delft which makes it easy for new visitors to find cheap second-hand bikes.

As a researcher my motivation is to contribute and improve innovative applications in radar monitoring. I am currently interested in earth surface deformation monitoring using radar images. From a technical point, radar images might be scary for beginners of radar monitoring because, in contrast with multispectral optical images, they are only composed of black and white pixels. Radar imagery is gathered from the microwave region of electromagnetic spectrum which has longer wavelengths than the visible and infrared regions. This characteristic feature allows microwave energy to penetrate through cloud cover and acquire images day or night, which is an essential advantage in remote sensing. Active satellite or airborne systems generate their own radar energy, transmit this energy to the earth's surface, and then detect the backscattered energy. The radar system measures the time delay between transmitted and received energy to determine the location of a target. However, due to its side looking geometric position it also has some drawbacks, such as shadow, layover and foreshortening, which can be a problem in mountainous regions. Radar interferometry uses phase information from the radar signal, i.e. phase differences of two SAR images which have been acquired from different antennae or at different times. This relative difference in time yields deformation monitoring at the line of sight direction. SAR imagery has also many specifications which might affect the magnitude of backscattering, such as wavelength, polarization, incidence angle and condition of the target surface.

I used both C-band ERS-ENVISAT and L-band ALOS PALSAR satellite images of my study area. All exposures of the study area were acquired from the archive of ESA because having long perpendicular and temporal baselines could affect the coherence between images. For the analysis, the Stanford Method for Persistent Scatterers/ Multi-Temporal InSAR (STAMPS /MTI) (2) approach was used. Although both C-band and L-band SAR images gave good results in the urbanized region, L-band indicated spatially larger subsidence than C-band. Nevertheless, because of forest cover in the suburban region C-band could not determine fine results. Having longer wavelength L-band data provided better results than C-band in the forest covered regions. At the end, a time series of deformation was created to analyze deformation in time and space. In my study area there were no conventional measurements such as levelling or GPS for the forest covered area, and there was just a few GPS measurement for a short time period over the urbanized region. Using different satellite images overlapping the same period showed that deformation analysis with SAR interferometry is quite enough to understand the deformation phenomena (3).

Currently I am a principal investigator leading two projects. My other team members





are from Yildiz Technical University Department of Geomatics Engineering (4), Istanbul Technical University Department of Geological Engineering (5), BeeSense Geosensing Solutions from Delft, The Netherlands (6) and Institute for the Electromagnetic Sensing of the Environment (IREA) of CNR, Italy (7). One of the projects is about deformation monitoring in the megacity of Istanbul, which is supported by DLR, and the other one is sinkhole subsidence monitoring, which is supported by ESA.

Even though both ENVISAT and ALOS-1 satellites are no longer acquiring SAR data, a new generation of satellites is on the way, such as ESA's Sentinel-1 and the Japanese ALOS-2 which were launched recently. Like many researchers I am very curious and am awaiting new SAR images that will allow me to investigate new phenomena all over the world.

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(2) Hooper A, Bekaert D, Spaans K, Arikan M (2012). Recent advances in SAR interferometry time series analysis for measuring crustal deformation, *Tectonophysics*, 514-517, pp.1-13. doi:10.1016/j.tecto.2011.10.013.

(3) S. Abdikan, M. Arikan, F. Balik Sanli, Z. Cakir (2014). Monitoring of coal mining subsidence in peri-urban area of Zonguldak city (NW Turkey) with persistent scatterer interferometry using ALOS-PALSAR, *Environmental Earth Sciences*, 71(9), 4081-4089.

## FUTURE ISPRS RELATED EVENTS

### **EARSeL & ISPRS Young Scientist Days 2014**

Warsaw, Poland, 16-20 June 2014

For more info visit: <http://www.earsel.org/symposia/2014-symposium-Warsaw/YoungScientistDays.php>

### **ESA INTERNATIONAL SUMMERSCHOOL ON GNSS 2014**

Ostrava, Czech Republic, 21-31 July 2014

For more info visit: <http://www.congrexprojects.com/2014-events/14m34/introduction>

### **ESA Earth Observation Summer School**

Frascati - Rome, Italy, 4-14 August 2014

For more info visit: <https://earth.esa.int/web/eo-summer-school/home>

### **ICSU General Assembly**

Auckland, New Zealand, 28 August - 3 September 2014

For more info visit: <http://www.icsu.org/>

### **1st International Geomatics Applications Conference**

Skiathos Island, Greece, 8-11 September 2014

For more info visit: <http://geomapplica.prd.uth.gr>

### **ITaRS Summer School 2014**

Jülich, Germany, 8-17 September 2014

For more info visit: <http://itars.uni-koeln.de/index.php/network-events/summer-school-2014>

### **International Symposium on Crop Growth Monitoring**

Nanjing, China, 13-16 September 2014

For more info visit: <http://iscgm2014.netcia.org.cn>

### **ISPRS Symposium: Thematic Processing, Modeling and Analysis of Remotely Sensed Data**

Istanbul, Turkey, 29 September - 2 October 2014

For more info visit: <http://isprstc7-2014.org>



### 2014 GeoInformatics Summer Camp & 11th ISPRS Summer School and 5th ISPRS 3S–Summer Students Seminar

by Sheryl Rose Reyes



The 11th ISPRS Summer School was held May 23-27, 2014 at Wuhan University in Hubei, China. Organized by Wuhan University; the State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing (LIESMARS); ISPRS Technical Commission VI; ISPRS Student Consortium; WG VI/4; WG VI/5; and WG VI/6; the Summer School was held in conjunction with the ISPRS Technical Commission VI Mid-Term Symposium with the theme, “Data, Information and Knowledge Sharing for Geo-Education”. This Summer School was integrated with the 2014 Geoinformatics Summer Camp and another ISPRS student-oriented activity – the 5th ISPRS 3S – Summer Students Seminar.

A total of 137 participants, 77 from various universities in China and 60 from foreign universities, attended this event. Four courses conducted in parallel were offered in this Summer School, delivered by distinguished experts: (1) Spatial Statistics in Practice – Professor Daniel Griffith (University of Texas, Dallas) and Professor Bin Li (Central Michigan University); (2) Geospatial Service Platform for Education and Research – Professor Huayi Wu, Dr. Peng Yue, Dr. Zhipeng Gui and Dr. Wei Guo (Wuhan University); (3) Mobile Laser Scanning and Mapping – Dr. Harri Kaartinen, Dr. Xinlian Liang and Dr. Antero Kukko (Finnish Geodetic Institute), and (4) Open Source Mapmaking Technologies – Dr. Jose Gustavo Rocha (University of Minho) and Dr. Zhijie Zhang (Fudan University). The lectures were presented in the morning and practical exercises were carried out at the assigned laboratories in the afternoon. As a final course requirement, the students were divided into groups and assigned a short project to present on the last day of the Summer School.

The participants were also given an opportunity to visit the History Museum of Wuhan University. The university, situated at Luojia Hill, is considered one of the most beautiful campuses in China and boasts a very rich history in the progress of education in China. After the visit, the participants were given free time to enjoy some of the university’s sports and recreational facilities.

The graduation ceremony was hosted by Professor Huayi Wu of Wuhan University. Excellent projects from the different courses were again presented by the students. One of the participants, Miss Dhruvi Kothari from Center for Environmental Planning and Technology (CEPT) University in India, shared her insights and experience about the Summer School. Dr. Igor Musikhin also conveyed a short message, inspiring collaboration and continued interaction among the participants of the Summer School.

The Summer School continues to be one of the key activities of the ISPRS Student Consortium. By gathering students from all across the globe, coordinating with different institutions to deliver lectures on the most recent advancements in geospatial information sciences, and by providing an opportunity for students and young researchers to share their experience and knowledge, this Summer School is another successful event of the ISPRS Student Consortium.



### In Memoriam: Dr. Carolyn Merry



With great sadness, we share the news that Dr. Carolyn Merry, Professor Emeritus and former Chair of the Department of Civil, Environmental and Geodetic Engineering at The Ohio State University, died Tuesday June 3, 2014, in a car accident. She was 63 years old.

Dr. Merry retired in May 2013 after 25 years of distinguished service at Ohio State. She began her career with the College of Engineering in the fall of 1988 as an Assistant Professor teaching surveying and remote sensing. Climbing the ranks, she became Department Chair in 2004. During her tenure as chair, Dr. Merry spurred major improvements to department labs, offices, and meeting rooms with money, time, and equipment donated by service-minded civil engineering alumni and industry partners. Her relationship with students, faculty, alumni and donors was remarkable and sincere. In 2009, with gifts from her husband, Robert K. Redfeld, the Carolyn J. Merry Engineering Scholarship Fund was established to provide renewable scholarships to civil or environmental engineering undergraduates.

Dr. Merry was a loyal and dedicated member of several professional societies including ISPRS, ASPRS and the University Consortium of Geographic Information Science (UCGIS). In 2003, she became President of UCGIS, the first woman to do so. Dr. Merry also served as the President of the American Society for Photogrammetry & Remote Sensing (ASPRS) in 2010 and President of the Coalition of Geospatial Organizations (COGO). Other leadership positions at the U.S. national level included serving as Chair of the American Society of Civil Engineering (ASCE) Civil Engineering Department Heads Coordinating Council, member of the National Geospatial Advisory Committee (NGAC) and member of the National Academy of Sciences, Mapping Science Committee. At the international level she was active in ISPRS in many ways. She served as the U.S. delegate for the ISPRS General Assembly at the 2010 ISPRS Centennial in Vienna, Austria and at the 2012 Melbourne Congress. She also generously donated her time to ISPRS by serving on the ISPRS Journal of Photogrammetry and Remote Sensing Helava Award Selection Committee and The ISPRS Foundation Award Selection Committee. Dr. Merry was a dedicated teacher, a caring advisor and engaging speaker who often shared her professional experiences during invited panels organized by student groups at ISPRS, ASPRS and UCGIS conferences.

She will be remembered for her dedicated, loyal, and enthusiastic support of many geospatial organizations. We send our condolences to her family, friends, and colleagues.



## INTERESTING LINKS

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### European GNSS

<http://www.gsa.europa.eu/>

### RESOURCES

#### LiDAR Data Portal

<http://www.redarrowmaps.com/lidarportal/>

#### Free FORMOSAT-2 Satellite Imagery

<http://www.csrnr.ncu.edu.tw/FS2CFP/>

### EDUCATION

#### Northwest Missouri – Online GIS Masters

<http://www.nwmissouri.edu/socialsciences/msgis/index.htm>

### FREE SOFTWARE

#### i3Geo 5.0

[http://www.gvsig.org/plone/projects/i3Geo/official/i3geo\\_5.0](http://www.gvsig.org/plone/projects/i3Geo/official/i3geo_5.0)

#### QSDM – Species Distribution Modelling for the QGIS Processing Toolbox

<http://conservationecology.wordpress.com/qgis-plugins-and-scripts/qsdm/>

### JOBS, CAREER OPPORTUNITIES

#### Canadian GIS & GEOMATCS Jobs

<http://canadiangis.com/www/gis-jobs>

### eBOOK

#### New wave at the forefront of the marine, earth and agricultural sciences

<http://www.research-europe.com/magazine/ENVIRONMENT/ENV18/index.html>

### RELATED ORGANIZATIONS, ASSOCIATIONS

#### International Council for Science – ICSU

<http://www.icsu.org/>

### TUTORIALS

#### ISPRS tutorials

<http://www.isprs.org/education/tutorials.aspx>



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SC Newsletter is at a stage where getting broader and better demands more people to be involved in the process of it's formation. That's why SC Newsletter team is looking for the following volunteers:

- More **people who would be willing to prepare articles** for existing or new rubrics,
- Designers of Newsletter,
- **English native speakers** for proof reading.

If you can help us with any of the above, please let us know!

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And also...

If you **would like to publish your research work** in the SC Newsletter send us your abstract on email written above. We will soon contact you for further information.