December 2010 Issue No. 1

GEOSPATIAL NEWSLETTER

BRONX COMMUNITY COLLEGE

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THE GEOSPATIAL MOVEMENT AT BCC!

Welcome to this first ever edition of *Geospatial Newsletter.* BCC is now geospatially enabled! We now have state of the art geospatial software that is housed in the Department of Chemistry and Chemical Technology. The ArcGIS version10 software is state of the art software that will enable scholars including students, faculty and staff from BCC to use it to their own advantage. Since August 2010 there have been many initiatives related to bringing in much needed geospatial awareness to BCC. These initiatives were driven by Dr. Sunil Bhaskaran and Prof. Neal Phillip from the Department of Chemistry and Chemical Technology. We are grateful to Senior Vice President George Sanchez for his constant encouragement and guidance throughout these developments.

We are proud to list these events:

1. Dr. Sunil Bhaskaran and Prof. Neal Phillip coordinated with Ms. Gina Moore (CUNY Central IT Office and coordinator of ESRI licenses) and Ms. Wanda Santiago (IT director, BCC) in securing licenses for ArcGIS software.
2. The ArcGIS software was installed over a period of two weeks at the Chemistry and Chemical Technology computer lab. We thank Kim (CLT) for his support in the installation of the software.
3. A presentation on geospatial technology was delivered to Senior Vice President George Sanchez.
4. Dr. Sunil Bhaskaran was invited by WEAS international remote sensing and GIS conference in Japan to deliver the Keynote address. (http://www.wseas.us/conferences/2010/japan/remote/Plenary1.htm)
5. Dr. Sunil Bhaskaran presented a paper at the 6th International Remote Sensing Conference. One chapter was published in the WEAS Book and one peer reviewed paper was published in the proceedings of the conference.
6. A seminar was delivered to students, faculty and staff at BCC by Dr. Sunil Bhaskaran on October 28, 2010. This seminar was organized by the Chemistry 2 and Chemical Technology department. This event was successful and we thank Prof. Neal Philip and Ms. Maribel Donado for their support.
7. Dr. Sunil Bhaskaran and Prof. Neal Phillip were invited by the Mayor's Office of Long Term Planning and Sustainability to participate in a meeting for potential collaboration in GIS and remote sensing research projects.
8. A GIS demonstration was organized for

Geospatial workshop for multidisciplinary BCC faculty and students on October 28, 2010.

Senior Vice President George Sanchez in the Chemistry department on November 11, 2010. Dr. Sunil Bhaskaran delivered this presentation which was also attended by Prof. and Chair of the Chemistry and Chemical Technology Department Prof. Neal Phillip.

9. Prof. Robert Lupo and Ms. Maribel Donado from the Department of Chemistry and Chemical Technology are attending GIS classes at Lehman College and Hunter College respectively.
10. An article was published by Prof. James Watson (Library Sciences) on applications of GIS for education. This paper appeared in an educational journal.
11. Prof. Neal Phillip, Dr. Sunil Bhaskaran, and Prof. Reid Strieby attended the one-day CUNY environmental cross-roads forum at the Graduate Center, CUNY.
12. A workshop on Basics of Geospatial Technology was organized by the Department of Chemistry and Chemical Technology. The workshop was delivered by Dr. Sunil Bhaskaran on December 7, 2010. Participants included faculty and students from across disciplines and other CUNY colleges (York College) as well as members of the IT department at BCC.
13. Dr. Sunil Bhaskaran's research on mapping New York City by using satellite and GIS data appears on the CUNY Office of Research website (http://www.cuny.edu/research/news-events.html/ navigate to Fall 2010, edition, page 20).
14. Prof. Neal Phillip and Dr. Sunil Bhaskaran are invited by the President, SVP and Provost David Lemmon of the City College to an event (29th Nov, 4:30pm) that earmarks the formation of the CUNY Remote Sensing of the Earth Science and Technology (CREST) Institute center at the City College of New York.
15. Prof. Neal Phillip and Dr. Sunil Bhaskaran attended the NASA funding workshop NASA INNOVATIONS IN GLOBAL AND CLIMATE CHANGE EDUCATION, at York College on December 3, 2010. A joint proposal is being proposed by Prof. Phillip as a result of this workshop.

Geospatial workshop for multidisciplinary BCC faculty, students and staff held on December 7, 2010

INTRODUCTION and BRIEF HISTORY of GIS

The advent of cheap and powerful computers over the last few decades has allowed for the development of innovative software applications for the storage, analysis, and display of geographic data. Many of these applications belong to a group of software known as Geographic Information Systems (GIS). Many definitions have been proposed for what constitutes a GIS. Each of these definitions conforms to the particular task that is being performed. Instead of repeating each of these definitions, I would like to broadly define GIS according to what it does. The activities normally carried out on a GIS include:

The measurement of natural and human-made phenomena and processes from a spatial perspective. These measurements emphasize three types of properties commonly associated with these types of systems:

- elements,
- attributes, and
- relationships.

The storage of measurements in digital form in a computer database. These measurements are often linked to features on a digital map. The features can be of three types:

- points,
- lines, or
- areas (polygons).

The analysis of collected measurements to produce more data and to discover new relationships by numerically manipulating and modeling different pieces of data.

The depiction of the measured or analyzed data in some type of display:

- maps,
- graphs,
- lists, or
- summary statistics.

The first computerized GIS began its life in 1964 as a project of the Rehabilitation and Development Agency Program within the government of Canada. The Canada Geographic Information System (CGIS) was designed to analyze Canada's national land inventory data to aid in the development of land for agriculture. The CGIS project was completed in 1971 and the software is still in use today. Also, the CGIS project involved a number of key innovations that have found their way into the feature set of many subsequent software developments.

From the mid 1960s to 1970s, developments in GIS were occurring mainly at government agencies and universities. In 1964, Howard Fisher established the Harvard Lab for Computer Graphics where many of the industries early leaders studied. The Harvard Lab produced a number of mainframe GIS applications including: SYMAP (Synagraphic Mapping System), CALFORM, SYMVU, GRID, POLYVRT, and ODYSSEY. ODYSSEY was the first modern vector GIS and many of its features would form the basis for future commercial applications.

Automatic Mapping System was developed by the United States Central Intelligence Agency (CIA) in the late 1960s. This project then spawned the CIA's World Data Bank, a collection of coastlines, rivers, and political boundaries, and the CAM software package that created maps at different scales from this data. This development was one of the first systematic map databases.

In 1969, Jack Dangermond, who studied at the Harvard Lab for Computer Graphics, co-founded Environmental Systems Research Institute (ESRI) with his wife Laura. ESRI would become in a few years the dominate force in the GIS marketplace and create ArcInfo and ArcView software. The first conference dealing with GIS took place in 1970 and was organized by Roger Tomlinson (key individual in the development of CGIS) and Duane Marble (professor at Northwestern University and early GIS innovator). Today, numerous conferences dealing with GIS run every year attracting thousands of attendants.

In the 1980s and 1990s, many GIS applications underwent substantial evolution in terms of features and analysis power. Many of these packages were being refined by private companies that foresaw the future commercial potential of this software. Some of the popular commercial applications launched during this period include: ArcInfo, ArcView, MapInfo, SPANS GIS, PAMAP GIS, INTERGRAPH, and SMALLWORLD. It was during this period that many GIS applications moved from expensive minicomputer workstations to personal computer hardware.

NUTS and BOLTS of a GIS

A Geographic Information System (GIS) combines computer cartography with a database management system. Figure 1 describes some of the major components common to a GIS. This diagram suggests that a GIS consists of three subsystems:

1. an input system that allows for the collection of data to be used and analyzed for some purpose;
2. computer hardware and software systems that store the data, allow for data management and analysis, and can be used to display data manipulations on a computer monitor; and
3. an output system that generates hard copy maps, images, and other types of output.

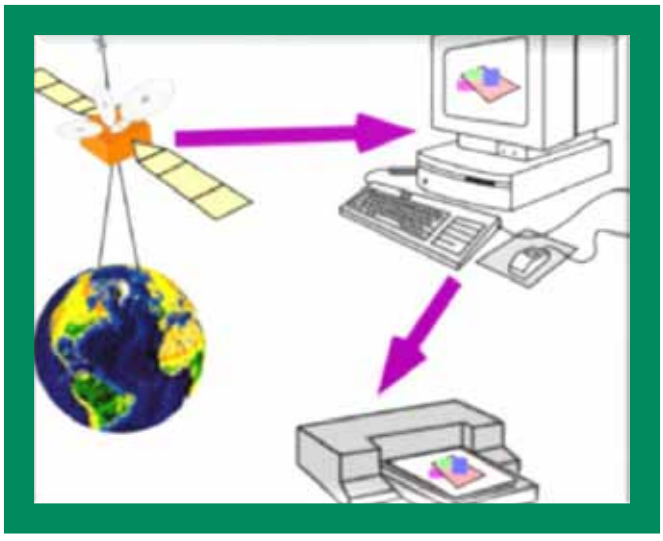

Figure 1: Three major components of a Geographic Information System. These components consist of input, computer hardware and software, and output subsystems. (Source: PhysicalGeography.net)

Geospatial Research Publications by BCC Faculty, Students, & Staff Since

In Peer Reviewed Journals

- Bhaskaran, S., Et Al., Per-Pixel and Object-Oriented Classification Methods for Mapping Urban Features Using Ikonos Satellite Data, Applied Geography (2010), Doi:10.1016/J.Apgeog.2010.01.009
- Bhaskaran, S. Determination of Optimal Scale Parameters for Segmentation of Urban Features From Multispectral Ikonos Imagery, Asian Journal of Geoinformatics. (Accepted With Minor Revision)
- Bhaskaran, S., Phillip, N., Sanchez, G., Case, T., Panayiotis, M. Applications of High Resolution Satellite Data for Extracting Key Urban Variables for Sustainable Development and Energy Initiatives. (Under Preparation)
- Bhaskaran, S., Phillip, N., Sanchez, G., Panayiotis, M. Introducing Geospatial Education at the Undergraduate, Graduate Levels in USA- Common Challenges and Opportunities. (Under Preparation).

In Proceedings of Conferences

- Bhaskaran, S., Paramananda, S., Ramnarayan, M. Per-Pixel and Object Based Classification for Extracting Urban Features From Satellite Data, 2010 CUNY Environmental Sciences Forum, Mon, Nov 8, 2010, 8:30 am - 5:00 pm, CUNY Grad Center, City University of New York, NY.
- Bhaskaran, S. Automated Algorithms for Extracting Urban Features From Ikonos Satellite Data. A Case Study in New York City, 6th International Conference on Remote Sensing (Remote'10) www.wseas.us/Conferences/2010/Japan/Remote/Index.Html Session - Urban Planning, October 4-6, 2010, Iwate, Japan
- Bhaskaran, S., Paramananda, S., Ramnarayan, M. "Improving Classification Accuracy of Spectrally Similar Urban Classes by Using Object-Oriented Classification Techniques: A Case Study of New York City." ASPSRS 2010 Annual Conference, April 26-30, 2010, Town and Country Hotel in San Diego, California, USA.

Book/ Chapters In Books

- Sunil Bhaskaran and Jianting Zhang (2010) – 'Hyperspectral Applications for the Urban and Natural Environment.' Springer-Verlag (Under Preparation)
- Sunil Bhaskaran – Chapter – Automated Algorithms for Extracting Urban Features From Ikonos Satellite Data. A Case Study in New York. Book Name – Selected Topics in Power Systems and Remote Sensing, 10th WSEAS/ IASME International Conference on ELECTRIC POWER SYSTEMS, HIGH VOLTAGES, ELECTRIC MACHINES (POWER '10); 6th WSEAS International Conference on REMOTE SENSING (REMOTE '10), Iwate Prefectural University, Japan, October 4-6, 2010, (http://www.worldses.org/books/index.html)

GEOSPATIAL
NEWSLETTER

If you have any interesting facts and achievements related to geospatial technology or applications of geospatial technology to your specialized study area, please contact us. You may email your stories to Dr. Sunil Bhaskaran (Sunil.Bhaskaran@bcc.cuny.edu) with a copy to Ms. Maribel Donado (Maribel.Donado@bcc.cuny.edu).

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