

The award places BCC in a strategic position amongst other CUNY institutions and in the Northeastern region and gives them a chance to lead research in specific applications areas. Due to BCC's current affiliation with Center for sustainable energy, NOAA-CREST and collaboration with NASA, the project has the potential to develop student internships and expose students to exciting careers in the geospatial industry.

Given the importance of emerging geospatial technology in U.S. and world over, the award will give Bronx Community College students, faculty and staff access to leading Industrial software and current geospatial data over New York City. The software and data will be used in fostering geospatial education and multi-disciplinary research at BCC as well as for developing spatial solutions for Natural Resources in the New York region.

Dr. Bhaskaran is the principal investigator of this project. Other project members includes a team of faculty and undergraduate students – Dr. Therese Soosairaj, Dr. Nicolas Anuku, Dr. John Molina and Ms. Maryam Karimi (faculty – Chemistry department) and environmental sciences undergraduate students – Ms. Karolyn Jimenez, Ms. Francine Frances, Mr. Leroy Brown.

For specific information related to the project please contact the PI - Dr. Sunil Bhaskaran

GeoEye Award for Ms. Karolyn Jimenez and Dr. Sunil Bhaskaran: Ms. Karolyn Jimenez has been awarded a GeoEye Foundation grant, which consists of high resolution satellite imagery over three major cities--New Delhi, India;

Sydney, Australia; and New York. Ms. Jimenez will work with mentor Dr. Sunil Bhaskaran on an international project with Delhi and Charles Sturt University in Australia. The project goals are to investigate and model spatial land cover patterns in these cities.

GRANT PROPOSAL SUBMISSIONS

Industrial Grant for Dr. Sunil Bhaskaran: Dr. Sunil Bhaskaran was awarded an Exelis grant, which consists of twenty-five seats of image analysis software. The time-sensitive grant was awarded in 2010 and expires in Spring 2013. The grant has enabled undergraduate students to take part in cutting-edge geospatial research since 2009.

NSF-ATE Grant Proposal Submission (\$890,000): Dr. Sunil Bhaskaran submitted a grant proposal to the National Science Foundation -- Advanced Technology Education. The proposed project will extend from 2013-2017 and has collaborators from middle, and high schools, two and four-year institutions, and employers--National Aeronautical Space Administration (NASA) and NOAA-CREST. Other members on the project team are Deans Meleties Panayiotis (York) and Neal Phillip (BCC), Dr. Ratan Dhar (York) and Mr. Eugene Adams (BCC).

Department of Transportation (DOT) (\$15,000): Dr. Sunil Bhaskaran and Professor Neal Phillip submitted a proposal for funding to the Department of Transportation for a one week program that will introduce high school students to the U.S. transportation industry and expose them to career opportunities

in the industry through Pathways to transportation education and careers (PTEC), a non-residential summer transportation institute for high school students.

CUNY Junior Faculty Research Award in Science and Engineering: Dr. Sunil Bhaskaran submitted a proposal titled "Object-based and per-pixel methods to extract terrestrial features from multi-sensor satellite data" to the CUNY Research Office for potential funding.

SPECIAL INVITATIONS

IEEE/IGARSS Melbourne, Australia: Dr. Sunil Bhaskaran was invited to serve on the Technical Committee of the Institution of Electrical Engineers/International Geosciences and Remote Sensing Symposium (IEEE/IGARSS) to be held July 21-26, 2013 in Melbourne, Australia.

WSEAS, Cambridge U.K.: Dr. Sunil Bhaskaran has been invited to deliver a plenary speech at the World Scientific and Engineering Academic and Society (WSEAS) February 20-22, 2013, to be held in Cambridge, United Kingdom.

GEOSPATIAL

NEWSLETTER

Volume 1, Issue No. 7 ■ February 2013

Welcome to the seventh edition of the *Geospatial Newsletter*, reporting on all activities related to geospatial technology at BCC. From 2013 onwards, the newsletter will be published twice in each academic year. Each issue will cover activities completed in fall and spring semesters. If there is a need, we will publish a special issue to cover summer activities. In this issue we focus on geospatial projects, grant submissions, and international collaborations, covering Fall 2012 activities.

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FALL 2012 - GEOSPATIAL TECHNOLOGY PROJECT

Six undergraduate students from environmental science courses participated in geospatial research under Dr. Sunil Bhaskaran's guidance. The main objective of the study was to create ground truth data using satellite and ancillary data for assessing classification accuracy. The project team, consisting of Ms. Francine Frances, Ms. Stephanie Huertas, Mr. Leroy Brown, Ms. Karolyn Jimenez, Mr. Fernando Duran, Mr. Jason Barbosa, and Ms. Kiady Diaz, will assess different types of classification techniques on multispectral scanner (MSS) high-resolution satellite data. Project members completed a report that describes the creation of ground truth image using high-resolution multispectral scanner (MSS) satellite imagery. The members showed excellent commitment and time management skills in completing the project and delivering reports on time.



Fall 2012 Geospatial Technology Group Members - On the lawns of BCC are (left to right) Ms. Kiady Diaz, Mr. Jason Barbosa, Ms. Stephanie Huertas, Ms. Karolyn Jimenez, Ms. Francine Frances, Mr. Fernando Duran, and faculty mentor Professor Sunil Bhaskaran.

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VISIT BY THE MAYOR OF TOWNSVILLE, QUEENSLAND, AUSTRALIA

Associate Dean Neal Phillip was invited by IBM to host the Mayor of Townsville Councillor Jenny Hill, who was visiting the U.S. to discuss sustainability projects and potential collaborations between the city of Townsville, James Cook University (JCU), and BCC. The meeting was chaired by associate dean for student success, Professor Neal Phillip and attended by

Dean David Taylor, Vice President Dr. Eddy Bayardelle, Assistant Vice President for Communications Ms. Diane Weathers, Dr. Mike Seliger, Ms. Jameelah, Dr. Aaron Socha (by Skype), Dr. Nicholas Anuku, and Dr. Sunil Bhaskaran. Mayor Jenny Hill and Mr. Greg Bruce (Executive Manager, Integrated Sustainability Services, City of Townsville, Queensland, Australia)

GEOSPATIAL

NEWSLETTER

If you have any interesting information related to geospatial technology, please email your stories or facts to Sunil.Bhaskaran@bcc.cuny.edu. We will be more than happy to include it in the next edition of the newsletter.



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delivered a presentation on key activities from the IBM Smarter Cities projects in Australia. The mayor detailed current efforts in sustainability in Townsville and the impact of IBM Smarter Cities project in Townsville. The mayor outlined many key areas of research where collaboration was possible, such as sustainable energy, disaster management, and urban planning. Mr. Greg Bruce mentioned that James Cook University (JCU) in Townsville, Australia, has been included as a participating institution in the

Orion Urban Design Project (managed by the University of Melbourne). Greg also mentioned he would help us set up links with IBM on the Smarter Cities project. Mayor Hill also spoke about the emergency recovery model that is so effective in Townsville and the possibility of using that expertise in New York City post-disaster scenarios.

Professor Neal Phillip and Assistant Professors Dr. Aaron Socha and Dr. Sunil Bhaskaran gave a brief presentation on

some of the current BCC activities and research in key science areas, such as bio-diesel, atmospheric research, and geospatial research.

Mayor Jenny Hill had a tour of the Hall of Fame and met with BCC President Carole M. Berotte Joseph, who welcomed the delegation and emphasized the need to work collaboratively. The president wished the visiting delegation a warm stay in U.S. and offered all assistance during their stay in U.S.



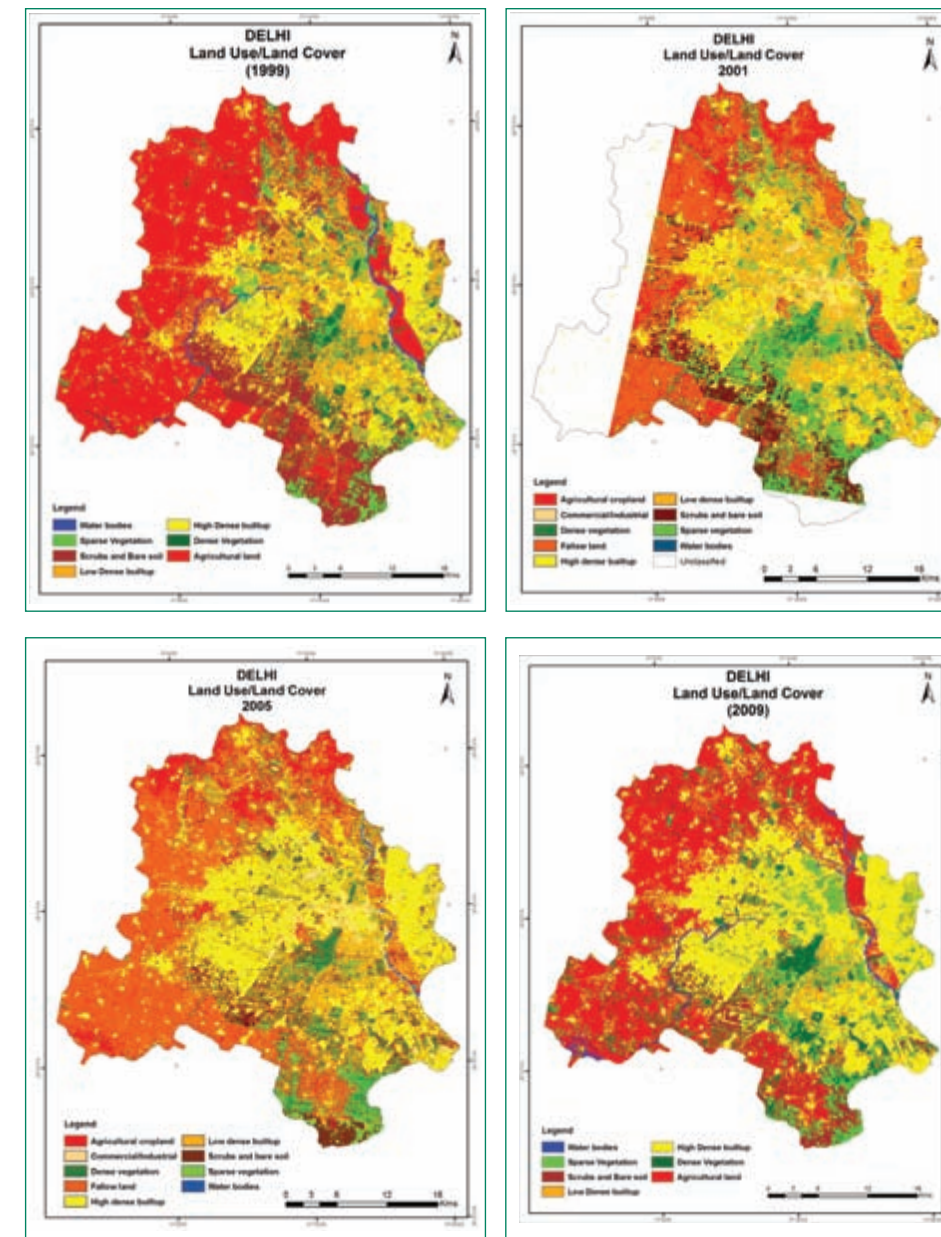
INTERNATIONAL RESEARCH SPOTLIGHT

Professor Atiqur Rahman - Jamia Millia Islamia University, New Delhi, India

BCC is collaborating with many institutions by conducting research with faculty from these institutions. In this edition we cover research conducted by Professor Atiqur Rahman from Delhi University.

In recent days, with the development of new satellite sensors with improved qualities, there is huge potentiality to use remote sensing satellite data sets for urban and regional studies. One such study on the land use/land cover over Delhi, India, has been carried out using multi-resolution, multi-sensor, and multi-temporal data sets. Landsat 7 Enhanced Thematic Mapper (ETM+) data was used in 1999 and Thematic Mapper (TM) for 2009 whereas Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) data was used in 2001 and 2005. The result shows that there were significant changes in all land use/land cover classes between 1999 and 2009. The study shows that both low dense built-up area-32.95% and agricultural land-24.49% have decreased during the last ten years. On the other hand, there is a significant increase in high dense built-up-32.04% and in low dense built-up-12.87% that is mainly on the fertile agricultural land. Due to fast pace of urbanization and commercialization, the faster land transformation is taking place not only in Delhi but also in other metro cities of India, such as Mumbai, Chennai, and Bangalore.

In another study, the land surface temperatures (LST) in terms of UHI and impervious surface fraction value were measured for Delhi itself. For the LST, Landsat and ETM+ data of Band 6 (thermal band) was used. The study shows the UHI intensity between the urban land covers and rural surroundings varies greatly within the range of about 2-3 °C in the past ten years. It is observed that over the built-up land there is higher surface temperature 32.90°C in 1999 and it increased to 34.07°C in 2009, and over sparse vegetation the temperature increase is a little less: i.e., 28.77°C in 1999 and 29.51°C in 2009. The study shows that both the spatial and temporal variations



CURRENT RESEARCH PROJECT COLLABORATION WITH UNIVERSITY OF DELHI, INDIA AND UNIVERSITY OF NEW SOUTH WALES AUSTRALIA

BCC will collaborate with the Jamia Millia Islamia University, New Delhi, India, and University of New South Wales, Australia, on a study that attempts a comparative analysis of three megacities- New York, Sydney, and New Delhi. The study will use high-resolution satellite data and geospatial technology to better understand the land use and urban morphology of these great

cities. Research will be carried out by professors at these three institutes and will be supported by students and other collaborators. The study will reinforce current efforts by BCC to collaborate with international institutes.

Results from the study will provide vital inputs to current global studies on land use changes and urban morphology of developed and developing nations.

PEER-REVIEWED PUBLICATIONS

Peer-reviewed paper in Geocarto International: A manuscript titled "Rule-based Classification of High Resolution Imagery over Urban Areas in New York City" was published in *Geocarto*

in surface temperature associated with ISA (impervious surface area) are again closely related to the effect of population growth and the urbanization and that has a negative impact on the local Delhi climate. The environmental impacts of land use change can be modeled at the city level using the integrated approach of remote sensing and GIS. Further, the use of geospatial technology may be applied to other urban areas in India or in other parts of the world where there is rapid urbanization.

International. The paper describes the development of algorithms that can be used to retrieve key terrestrial features from time-series of satellite images. The paper is co-authored by undergraduate student Ms. Karolyn Jimenez, who is conducting research in geospatial technology with faculty mentor Dr. Sunil Bhaskaran.

GRANTS ACTIVITY AWARDS

Natural Resources Imagery Grant Program (\$100,000):

Dr. Sunil Bhaskaran received a Natural Resources Imagery Grant Program Award from two global geospatial industrial giants - 'Environmental Systems Research Institute (web site - www.esri.com) and Canada based PCI Geomatics (web site - <http://www.pcigeomatics.com/>). The award consists of cutting-edge industry standard suite of geospatial software, time-series of current multi-sensor optical, radar satellite data over New York City and a virtual training package - all of which is valued at \$100,000.

The geospatial data consists of time-series of 2 Earth Observation multi spectral satellite data - 'RapidEye' and 'RADARSAT-2'. All data is over New York City which will give students and faculty at BCC multiple opportunities to develop geospatial applications in STEM and NON-STEM disciplines. Dr. Bhaskaran and his team of researchers will investigate new data fusion techniques and develop innovative land cover land use classification model. "A multi-sensor approach is essential to extract the best resolution from optical and microwave datasets such as Rapid Eye and Radarsat-2. We will develop land cover land use model over New York City using both traditional per-pixel methods and object-oriented approach".