

ITC News



- University of Twente
- GEONETCast
- Competing Interest in Space
- 3D City Models

2010-1



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introduction

With the first *ITC News* of 2010, we open a new chapter in the chronicles of ITC as it settles down to life as the Faculty of Geo-Information Science and Earth Observation. As you know, ITC became the sixth faculty of the University of Twente on 1 January this year, so it will come as no great surprise that this issue introduces some new contributors and highlights the organisation and objectives of the University. In fact, you could do worse than turn directly to our main feature on page 2, an article that gives a potted history of the University, from the motivation behind its foundation to the challenges on today's agenda. So the past, the present, but also the future, with new trails being blazed in the research domain (page 14).

Although not located on the UT campus, the ITC building is just a short bike ride away. Even in this age of satellites and robotic explorers, pedal power has its adherents, as well as undeniable advantages, so perhaps the articles on pages 16 and 8 will induce you to leave your car in the garage occasionally.

From the mobility of bikes to the mobilities of the Erasmus Mundus programme may seem quite a leap – but after all this is ITC News. The articles on pages 23 and 18 will arouse the interest of many, and with a click on the links you can satisfy your curiosity concerning this remarkable opportunity. And maybe take advantage of it?

ITC alumni across the world have amazing tales to tell – as those who have attended alumni gatherings will readily confirm. This issue highlights the remarkable career of Siti Nurabya (page 27), illustrating what you can do if you really set your mind to it. And the ever-growing ITC alumni network gained two more members on 26 March, when Sander Oude Elberink and Shi Pu were awarded their PhDs. If you are wondering how to put your laser scanner to good use, page 12 offers a one or two suggestions. But do you prefer to keep your feet on the ground? Or do you have a head for heights?

So after the momentous changes that took place at the turn of the year, ITC is settling down to business as usual – although, of course, at ITC business is anything but usual!

Virtually yours, *Janneke Kalf* *Jorien Terlouw*
Managing Editor *Editor*

colofon

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2010 number 1

The University of Twente

Knowledge That Benefits Society

ITC News

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Although half a century ago the concept of globalisation was as yet non-existent, the phenomenon itself had already appeared. Since the middle of the 19th century, textiles had been the mainstay of Enschede, the Dutch city that has been home to ITC for so many years.

For decades, thousands of workers had laboured at spinning machines and weaving looms in huge factory workshops. But the manufacturers discovered that textiles could be produced in Asian and African countries too and that the wages there were considerably lower than in the Netherlands. So around 1960 production was transferred abroad, seriously jeopardising the economy and employment in Enschede and the surrounding areas (better known as Twente). This situation formed the background of what is now the University of Twente, the university of which ITC has formed a part as the sixth faculty since 1 January 2010.

Country Estate

By the end of the 1950s, the Netherlands had recovered to a large extent from the ravages of the German occupation (1940–1945). The economy was growing vigorously, there was more or less full employment, and industrialisation and innovation were plentiful. Hence the need arose for a third source of technological education at the highest level, alongside those already

existing in Delft and Eindhoven. The economic situation in Twente coupled with the more or less free availability of an attractive country estate prompted the government to opt to establish this education in Enschede rather than in a competing town such as Arnhem or Deventer. In 1961 the then Technische Hogeschool Twente was founded. Later the name was changed to the University of Twente (UT), partly because by now non-technical education was also being provided. In 2011 the UT will celebrate its 50th birthday, while its “youngest daughter”, ITC, will already be 61.

Campus

The UT is the only real campus university in the Netherlands: this means the only university where living, working, shopping, studying and recreation take place at the same location. This location is the splendid Drienerlo country estate and surroundings, approximately 140 hectares all told and situated on the western fringe of the municipality of Enschede. About 2,000 students and some dozens of staff members live on the campus. There is a supermarket, a hotel, a hairdresser's, a stream, a theatre, any number of sports facilities, ponds and in particular a great deal of greenery. You don't come across just students and staff on the campus, but also many passers-by: cyclists out training, young families with buggies, tourists on bikes or on foot, equestrians, and drivers of all sorts of carriages. And the students strolling around are not just from Twente or the Netherlands but increasingly from abroad: from neighbouring Germany of course, but also from China, Indonesia, Turkey and Mexico. The university focuses its policy on recruiting (excellent) students from ever more countries.



Entrance of the available country estate before 1960



Living, working, shopping, studying and recreation take place at the same location

Knowledge Park

But most important on the campus are naturally the buildings. The lecture halls and the laboratories and the activities that take place there: education, research, not to forget enterprise. In the Netherlands, the University of Twente is known as “the enterprising university”. In light of the origin of the UT sketched above, enterprise is a birthmark. The UT had to, and still has to, take care of employment in Twente. In the direct sense through its 3,000 or so staff members, in the indirect sense through supply companies, and last but not least through so-called valorisation, the marketing of knowledge and findings developed at the UT. With this last objective in mind, the Knowledge Park Twente has been set up by the UT, the province of Overijssel and the municipality of Enschede, with a view to creating at least 10,000 new high-grade jobs before 2020. In the meantime, hundreds of small businesses have sprung from the UT, as well as numerous student entrepreneurs.

Faculties

Education within the UT is organised in five faculties, in addition to ITC. These are respectively Engineering Technology; Electrical Engineering, Mathematics and Computer Science; Behavioural Sciences; Management and Governance; and Science and

Technology – three faculties where exact sciences and two where social sciences are taught, and at all five at bachelor, master and PhD level. Moreover, the range is wide, from psychology to mechanical engineering, from civil engineering to technical medicine, from communication studies to chemical engineering. In addition to the major study, each student should choose a minor to develop academic skills that might otherwise remain dormant, such as recognition of the social context, relevance and qualification of own discipline, learning to communicate with non-peers, etc.

Institutes

Unlike at ITC, where research is carried out within the faculty, at the UT research is shaped within six institutes. Scientists from different faculties work together on the basis of a truly multidisciplinary approach. The fact that the UT has not only considerable (applied) technology but also substantial social and behavioural sciences in house distinguishes it from the other technical universities, as well as from the general universities, and consequently endows it with a unique position. In this way, new technology is developed within the context of behavioural and social sciences. So, for example, the psyche of the future user is taken carefully into consideration when designing new equipment.

The six institutes, some of which are of international repute, are MIRA (Biomedical Technology and Technical Medicine), CTIT (Centre for Telematics and Information Technology), IBR (Institute for Behavioural Research), IGS (Institute for Governance Studies), IMPACT (Institute for Mechanics, Processes and Control Twente) and MESA+ (Institute for Nanotechnology).

Recently the 3,000th doctoral degree was awarded at the UT. Over its almost 50-year existence, this works out at an average of rather more than one degree per calendar week.

Valorisation

Although the primary funding of the Dutch universities originates from the state, increasingly this is failing to keep pace with the needs. That is why the universities are on the hunt for targeted subsidies for research, both from public (second flow of funds) and private (third flow of funds) resources. The third flow of funds in particular can yield substantial sums, although matters of principle and ethical questions may also arise – for example, questions concerning ownership of the research and the research results, questions on the outcome, and questions on the methods used.



At the UT research is shaped within six institutes

Traditionally, technical universities – and here the UT is no exception – have mainly worked closely with the business community, although research is also carried out at the request of non-governmental organisations. Intermediate and small-scale businesses as well as multinational companies (including Philips, Siemens, Boeing, Thales) enter into research contracts with the UT. In general, the regional business community also knows its way to the University of Twente. Each year, UT staff members are able to secure tens of millions of euros in terms of second and third flows of funds.

Cooperation

The UT is no world unto itself. It connects with its environment in numerous ways, both the physical and the scientific. Relations with Enschede, the region of Twente and the province are good. It cooperates with the football club FC Twente and with medical institutes in the region. It also cooperates with the two other technical universities within a federation that focuses, among other things, on the direction of the technological domain in the Netherlands. Furthermore, there is intensive cooperation with the universities in Wageningen (agriculture, energy, sustainability) and Groningen (medical science) and with a group of young enterprising research universities in Europe.

Scientists throughout the world know the UT. The number of citations from scientific articles by UT staff (in 2009 more than 20,000) places the UT among the top 25 of the 250 biggest European universities. And then to think that the UT, with less 10,000 students, is actually not a very big university!

Cooperation with ITC was already in progress before that institute became part of the UT – for example, concerning the “water footprint” concept: the quantity of water necessary for the production and transport of crops and industrial goods. So also concerning the production of crops from which alternative energy can be extracted – crops that can also serve as food, so it is possibly better to extract the alternative energy from algae. These kinds of issues



Meander building housing IMPACT (Institute for Mechanics, Processes and Control Twente)



Scientists throughout the world know the UT

are naturally of great importance to both ITC'ers and their customers.

Obviously, the integration with the University will strongly promote the intensity of the relations. In this respect, the Faculty ITC and the research institute CTIT have recently agreed a joint research programme in the field of geo-information sciences. One line of research will focus on removing "noise" from the enormous quantity of data that satellites collect, another on the possibilities of storing dynamic data, for example flight movements around an airport or changing land use (see page 14).

C-Band Reception for GEONETCast and DDS Operational at ITC

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GEONETCast (a global network of communication satellite-based data dissemination systems) provides free near-real-time environmental and Earth observation data (in situ, airborne and space-based) and derived products to a worldwide user community. It is part of the emerging Global Earth Observation System of Systems (GEOSS) led by the Group on Earth Observation.

Back in 2005, a Ku-band-based reception station was installed at ITC, pointing at EUROBird 9 at 9° East. The signal reception of such a configuration is limited to Europe and Northern Africa. In September 2009, a C-band GEONETCast reception configuration was installed at ITC. This antenna, with a diameter of 1.8 m is pointing to Atlantic Bird 3 at 5° West. It is now possible at ITC to also monitor the GEONETCast C-band data dissemination scheme over Africa. Apart from the antenna, a C-band LNB and

a Skystar-2 DVB board were used. Even though the antenna dimension is smaller than proposed by EUMETSAT, the reception quality is good.

For pointing, use was made of a dish pointer utility (available at www.dishpointer.com/). Take the GPS position of the antenna location and the utility will give you the angles needed to correctly point the antenna (to Atlantic Bird 3, situated at 5° West).

For use of the data delivered through GEONETCast, a plug-in (the so-called GEONETCast Toolbox) was developed in ILWIS 3.6 and further upgraded in ILWIS 3.7. This freely available utility currently supports over 100 satellite image and product import routines. Using this together with the existing processing utilities of ILWIS, users can now easily integrate the enor-



The C-Band antenna in the garden of the ITC building in Enschede

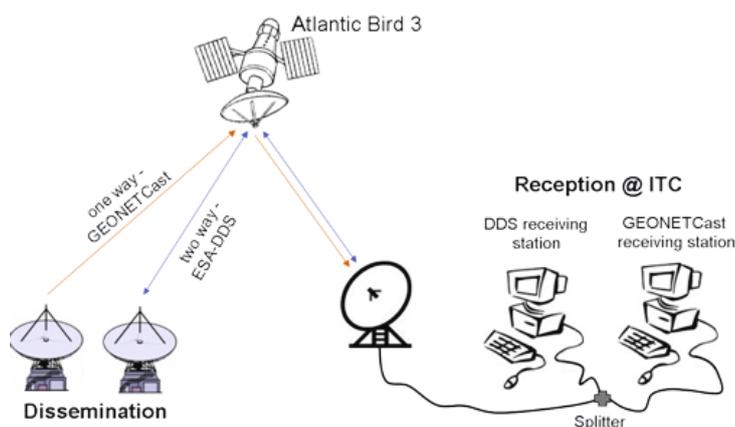


The GEONETCast Toolbox, a plug-in in ILWIS 3.7

For further information on the SkyStar-2 DVB board settings, you can contact maathuis@itc.nl or reinink@itc.nl. For further information on the configuration of a Technotrend Budget S-1401 DVB card, consult the DevCoCast Reception Station Setup Guide Book prepared by the Marine Remote Sensing Unit, University of Cape Town, or contact mark.matthews@uct.ac.za.

rious amount of environmental data delivered via communication satellites on a global scale into various applications related to weather, atmosphere, oceans, land, vegetation, water and environment.

In December, the same antenna was used to set up the European Space Agency's (ESA) Data Dissemination Service (DDS).



Graphical presentation of a combined GEONETCast and DDS architecture

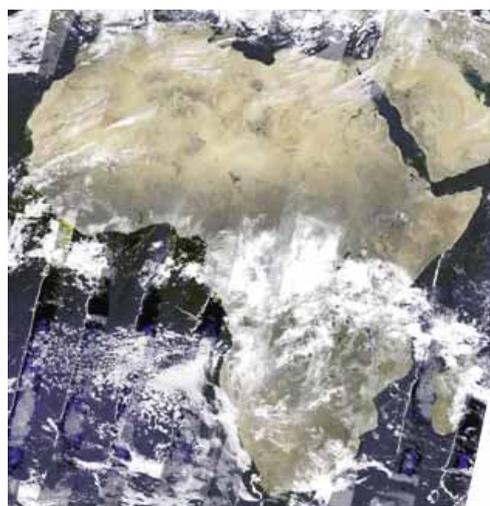
This service also uses digital video broadcasting and for Africa is using the same communication satellite to disseminate the data recorded by ENVISAT (MERIS, AATSR and ASAR) within 24 hours of sensing. A graphical presentation of the configuration is presented in Figure 3. The low-cost C-band ground receiving system now consists of two computers, one receiving the GEONETCast data stream and the other the ESA ENVISAT data using the DDS. This ground receiving computer is equipped with a BroadLogic Satellite Express 2530XL USB DVB board. The data are broadcast from approximately 20:00 hrs to 06:00 hrs CET and some 5 to 10 gigabytes are received on a daily basis. An important added advantage of the DDS is the two-way data dissemination capability that allows organisations to

upload data as well. A point of contact for DDS is Stefano Badessi, application support senior engineer, ESRIN (Stefano.Badessi@esa.int) or www.esa.int.

Through DDS, ENVISAT data and products (from ASAR, AATSR and MERIS) such as vegetation indices, brightness temperatures, reflectances, calibrated TOA radiances, cloud thickness, water vapour and geophysical products can now be obtained on a regular basis (see also Figure 4).

For the processing of the ENVISAT data, use can be made of the Basic Envisat toolbox for (A)ATSR and MERIS (BEAM), which is freely available at:

www.brockmann-consult.de/beam.



Composite of MERIS reduced resolution data of 11 to 13 January 2010

For more information

www.itc.nl/GEONETCast-General-information

Competing Interests in Space: A Worldwide Problem

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The crowded city of Istanbul has experienced a major population explosion over recent decades.

Nearly 12 million inhabitants live in the eastern and western areas, compared with only one million people just 50 years ago. The inner city's developing areas and the suburbs on the outskirts are almost as densely populated as Manhattan city, roughly 2,333 inhabitants per square kilometre, requiring planners and politicians to take advantage of new technologies in order to create future models to develop and preserve the historical areas and ancient monuments. ITC is one of the higher education institutes conducting fieldwork to improve the quality of urban planning and development in Istanbul.

As he comes to the end of his 18-month master's study at ITC and looks back on the peak moments, James Gachanja (27) says, "What we have learned in Istanbul, we can apply to most urban areas. The traffic congestion problem is a universal problem. The whole city is confronted with many contemporary issues – hence the choice to study this metropolis."

Back home in Nairobi, he'd wake up in the dark at 5:00 am to walk to the public transportation system consisting of minivans (no buses). "If I left my house half an hour later, I'd be stranded in traffic and be two hours late for work. You never know when the minivan is coming and you don't know what the driver will charge. You yell out, "Hey, stop – and then you jump in."

The researcher worked and completed his undergraduate studies in urban and regional planning at Maseno University in 2006, and then directly went to work for the Kenyan government as an intern under the Ministry of Lands in the Physical Planning Department. One of his bosses in the government decided to resign from his

post and started a private physical planning consultancy firm, Ecoplan Kenya, where Gachanja worked as an associate consultant. "I worked on day-to-day assignments involving the application of spatial data and information. We serviced a wide range of clients, in both the public and private sectors."

Coming here, he was struck by the precise efficiency of the Dutch and how it differed from what he was used to in Africa. "If I want to get to Rotterdam by 2:30 pm then I catch my train and I get there there by 2:30 pm. That's the Dutch way. The organisation of people, the design of buildings and the level of efficiency are amazing. I was looking at the way the bike system works. I said, "Okay, there are separate bike lanes, separate from the car traffic. Pedestrians are also provided for and people travelling in wheelchairs have special places where the pavement is designed to help them to get around. There are sensors on the bike paths to signal the lights. So these things I've come to appreciate." He'd never left his country before, so it was a cultural shock. "Look at this ... everything is simply wow! You go to the toilet and it flushes, and you say 'Who did that?'" You take a train, and you get there precisely on time."

Gachanja set out to evaluate the merits of the four-step transport model (FEM), using the case of Istanbul. Opening up his laptop computer in the Horst building, the massive city grid of Istanbul and a matrix are revealed. "You can see the transportation network and all the connecting roads," he said. "In Istanbul, the areas nearest the waterways produce the most trips but people are moving all over the city. You try to discover the reality of the situation through the use of models." Through his research, he came

to the conclusion that the sequential approach of the FEM model offers no feedback from one step to another and sometimes doesn't represent reality.

In Nairobi, most people in the government are still using paper maps to plan cities. On the other hand, Gachanja has noted the competitive nature of the private sector, which uses the latest technologies. "Urban planners can more effectively target and inject resources where they are needed. Slums in Nairobi, for example, have illegal settlements. Implementing science and using modern technologies can show where the greatest need is (the hot spots of poverty) and where distances to schools and hospitals are substantial. People are living in swamp areas. You need to make urban planning fit the needs of society."



James Gachanja

education news

Training Event at the 5th World Urban Forum in Rio de Janeiro

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Training events at the WUF are in high demand as there are “only” 24 such events over three days and these can cater for less than 10% of the total number of participants. This is the third WUF in a row where ITC has offered such a training event.

This training was organised by Graciela Peters-Guarin (TU Dortmund), Javier Martinez and Jeroen Verplanke (Department of Urban and Regional Planning and Geo-Information Management). The title this time was “How to Use Participatory GIS for Targeting Vulnerability and Inequality at Neighbourhood-City Level”. For three hours, 42 participants from all over the world were exposed to the state of the art in participatory approaches for vulnerability studies. The training was designed to identify the most relevant aspects that comprise socio-environmental vulnerability and inequality in neighbourhoods and to scale up the relevant indicators to monitor and analyse the extent of inequality and vulnerability at city level. Participants were introduced to the use of spatial information and urban indicators at different aggregation levels to bridge the vulnerability and inequality gap. The training included a number of mini lectures, a data collection exercise (outside the forum venue), a computer exercise and a discussion session. Although it was logistically difficult to organise the mini fieldwork, mainly because of security issues and time constraints, it was highly appreciated by the participants.



For three hours, 42 participants from all over the world were exposed to the state of the art in participatory approaches for vulnerability studies



The small data collection exercise took participants out into the residential area behind the venue

The training was used as a platform for the critical and reflective use of participatory spatial information and mapping technologies. In particular, we were able to demonstrate the possibilities of these tools and skills

to identify, analyse and target both social and environmental vulnerability using a bottom-up and multi-scale approach. The training was performed in a highly active and interactive way, not only in the sense that

the participants were able to present and exchange their own experiences but also because they were able to observe in a participatory way some of the aspects related to vulnerability, deprivation and inequality in the proximity of the WUF venue. The small data collection exercise took participants out into the residential area behind the venue – an urban area where although there was not much risk to the data collectors, the forum organisers still feared for their safety. The data collection exercise finally went ahead without any problems, with an escort of UN security personnel.

Using handheld computers in a participatory transect walk, participants were able to identify at neighbour-

hood level the most relevant aspects that comprise socio-environmental vulnerability and inequality. Although this was a challenge to us owing to the location and the time restriction, we received a very positive feedback from the participants. We were also able to demonstrate the use of Google Earth and Street View to perform a virtual transect walk in Mexico DF and compare the results with census data. This was particularly useful in demonstrating the possibilities of integrating different data sources from top-down and bottom-up origins. Participants were given online access to the materials used in the event to enable them to revisit them at a later moment. The discussion at the end of the workshop allowed us to confirm that for many

participants the use of participatory/bottom-up data collection could be useful in triggering communication, discussion, and action towards bridging the vulnerability and inequality gap.

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research news

Researchers Develop Fast Methods for Making 3D City Models

ITC News

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There is a growing demand for 3D city models but creating these models is expensive and labour-intensive. Shi Pu and Sander Oude Elberink of the Faculty ITC, University of Twente, have each developed a method to largely automate this process, using topographic information from the land registry in combination with laser measurement data. Pu and Oude Elberink were awarded their PhDs by ITC on 26 March.



This data did not come from ground level, but from the air: the laserscanner was used from an aeroplane

We already have 2D maps of most cities, which show exactly where roads and buildings are located. Nevertheless, there is an increasing demand for 3D maps of cities because with them you can give more insight into urban development. For example, in a 3D model architects can easily see the effect a new building will have on the quality of light in a neighbourhood. Furthermore, the models make it possible to map out the consequences of flooding, and can also be used to make a virtual tour of a city. However, the creation of these 3D city models by hand is extremely labour-intensive and time-consuming. Shi Pu and Sander Oude Elberink therefore investigated how these models can be created using as much automation as possible. They used two different methods for this, both making use of topographic information from the land registry in combination with laser measurement data. Where previously all the data had to be entered manually, now the computer takes over most of the work.



Sander Oude Elberink

Sander Oude Elberink and Shi Pu were awarded their PhDs on 26 March by the Faculty for Geo-Information Science and Earth Observation (ITC) of the University of Twente. Their tutor was Professor George Vosselman. Their research projects were made possible by finance from the Investments in Knowledge Infrastructure (Subsidies) Decree. The two theses, *Acquisition of 3D Topography: Automated 3D Road and Building Reconstruction Using Airborne Laser Scanner Data and Topographic Maps* (Oude Elberink) and *Knowledge-Based Building Facade Reconstruction from Laser Point Clouds and Images* (Pu), are available in digital form in the ITC library (www.itc.nl/Pub/Home/library).

From the Ground

In his research, Shi Pu made use of terrestrial laser scanners. These are devices that project laser beams onto buildings from the ground and make recordings of them. It is possible to reconstruct objects in great detail using this method. To “teach” the computer to recognise buildings or parts of buildings, Pu first created a databank containing the most important characteristics of a building, such as doors, walls and window bays. The computer compares the measurement data with the known characteristics of buildings, and so attempts to identify each element. Pu then combined this information with 2D topographic information from the land registry, and so created 3D mod-

els. With Pu’s method, it is still necessary to identify a few elements of buildings by hand, but his method is more than ten times faster than the traditional approach. The method also gets faster and faster to use, because the databank “learns” more each time information is entered manually.

From the Air

Sander Oude Elberink also made use of laser data together with 2D topographic information from the land registry in his research. His laser data did not come from ground level, however, but from the air: the laser scanner was used from an aeroplane. One of the challenges in Oude Elberink’s research was to create ac-

curate maps even in areas that cannot be seen from above, such as where roads run above one another. His method is the most accurate for images from above, while Pu’s method is more accurate for images from street level. Fortunately, the two researchers’ models can be easily combined to create even more accurate models.



Shi Pu



Shi Pu made use of terrestrial laser scanners. These are devices that project laser beams onto buildings from the ground and make recordings of them

ITC and CTIT Embark on Joint Research

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The Faculty ITC and the UT institute Centre for Telematics and Information Technology (CTIT) have together embarked on a new research programme in the field of geo-information sciences. Eight PhD students are tackling four different research directions. It is expected that the research will yield its first fruits in the shape of workshops and publications within two years.

The line of research geo-information sciences is a rather theoretical programme and one where the applications will be identified only later. The research is focused on the connections between informatics and remote sensing – the collecting of data with the aid of satellites. Friday 12 March 2010, four themes were presented during a kick-off-meeting and each is coordinated by a researcher from ITC as well as one from CTIT.

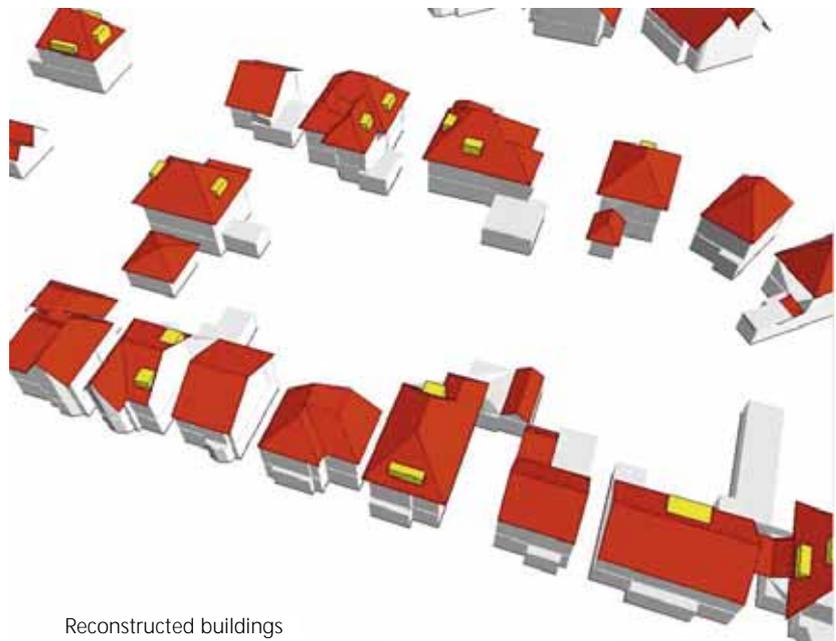
Two themes relate to neogeography. The subject of one is the channelling of large databases. There is frequently a good deal of noise in the data collected by satellites and the question is how to remove this noise and efficiently store and retrieve the data again. The other neogeographical theme concerns the way in which you can chart new elements. An atlas usually shows statistical data; here, however, ways of storing dynamic data will be investigated, for example regarding changing land use or the flight movements around a large airport.

A third theme, stochastic image mining, focuses on visualising spatial extremes. Average values (for example regarding air quality and precipitation) are often well known, but how do you investigate when and where high or low values occur, such as an extreme quantity of particulate or the location and period of great drought? At the same time the effects of traffic or air quality will be scrutinised.

The fourth line of research is going to make use of laser technology to visualise the shapes of houses and other buildings. Although laser scanners have already succeeded in mapping the height of buildings, they have not yet been successful in some

other aspects. The aim is for these scanners to make an autonomous distinction between, for example, houses dating from the 18th and 19th centuries. The gaming industry can use such technology to make more realistic shapes in computer games.

Two PhD students have been assigned to each theme, one at CTIT and one at ITC. Professor Alfred Stein, head of the ITC department Earth Observation Science and project leader of the theme stochastic image mining, expects the cooperation to deliver the first visible results within two years. According to him, these may be workshops, but also publications.



Reconstructed buildings

project news

Capacity Building for Hazard Assessment in Central America

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During the period 22 February to 5 March 2010, two workshops in the field of disaster risk assessment were conducted by ITC staff members in Nicaragua and Panama. The events formed part of the activities that the Council of Central American Universities (CSUCA) organises to bolster the exchange of knowledge and the development of research capabilities in the region.

In this case, the workshops were executed within the framework of the Programme for the Development of Research Capacity to Prevent and Mitigate Natural Hazards in Central America (DIPREDCA). This programme is coordinated by the Central American University Network for the Research on Nature-Induced Hazards Prevention and Mitigation (RUNIRED). The main objective of the programme is to foster disaster risk management research and capacity building activities at the regional level, promoting the participation of universities and research centres from Central America and also involving international institutions.

The regional implementation of the DIPREDCA programme is managed in coordination with eight national nodes, each node being coordinated by a university. The main fields of interest are risk management and environment; coastal zone degradation; vulcanology; meteorology; hydrology; watershed management; and landslides. The nodes are responsible for the activities concerning specific thematic areas assigned to each country.

The workshops addressed issues concerning two topics:

- the dynamic modelling of landslide hazards
- remote sensing, GIS and hydrological hazards

The main target audience consisted of academic staff from the RUNIRED universities, researchers, experts from government agencies, and master students. Once the key topics had been identified by the local institutions, ITC was responsible for defining the academic content and developing the required teaching material. The first workshop, on landslide haz-

ards, was organised together with the Geoscientific Research Center of the National University of Nicaragua, Managua. The course focused on methods for the dynamic modelling of the initiation of landslides and the assessment of their run-out. The second workshop, on hydrological hazards, was organised together with the National University of Panama. The course focused on the use of remote sensing/GIS modelling tools to obtain relevant information for hydrological analysis and the assessment of related flood hazards.

ITC has a long tradition of cooperation with Central America, with both universities and government institutions.

In the field of disaster risk management capacity development, two of the main projects in which ITC has participated are the Regional Action Programme for Central America (www.itc.nl/external/unesco-rapca/start.html) and the Central American Probabilistic Risk Assessment (www.ecapra.org). Currently, the contact people with regard to the planning of ITC-CSUCA-RUNIRED activities are Cees van Westen (westen@itc.nl) and Sabine Maresch (maresch@itc.nl).



The total number of participants was 41 (20 in Panama and 21 in Nicaragua)



As a result of the workshops, new possibilities for the development of cooperation projects were opened up



Participants of the workshop on Hazard Assessment

The total number of participants was 41 (20 in Panama and 21 in Nicaragua), representing about 20 national institutions (universities and government offices).

As a result of the workshops, new possibilities for the development of cooperation projects were opened up. In particular, ITC is now exploring various options to collaborate with

CSUCA-RUNIRED and to prepare a proposal for the new call of the ALFA programme.

Researching Urban Cycling Inclusiveness: CAN International Seminar at COPPE Rio de Janeiro

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Since 2008, staff of the Urban and Regional Planning and Geo-Information Management department have been coordinating the international Cycling Academic Network (CAN). CAN is concerned with studying the role of cycling in sustainable urban development and currently supports six PhD students from India, Brazil, South Africa and Rwanda. Part of its remit is to conduct a series of workshops and seminars in the various cities where CAN research is carried out. After Enschede and New Delhi, this time a seminar was organised in Rio de Janeiro, Brazil, parallel to the World Urban Forum.

Rio de Janeiro is a city of more than six million people who own two million cars and a staggering four million bikes! However, only 3% of the people use their bicycles as a transport mode to go to work or school. Luckily, this is changing, and each day more people are using their bikes for everyday use. Bicycle paths have been introduced, a public bike hire scheme is operational, and bicycle campaigns have been initiated. With large sporting events such as the football World Cup and the Olympic Games coming to Brazil, it is expected that cycling will be given greater attention in transport and planning policy, hence contributing to increasing accessibility while relieving traffic congestion and reducing

pollution and accidents. For these reasons, Rio de Janeiro was obviously a perfect location to host the next CAN scientific workshop. On 26 March 2010, CAN scientists and invitees gathered in the Federal University of Rio de Janeiro (UFRJ) to discuss such issues as the level of service regarding bicycle infrastructure, cycling potential in developing cities, models of behavioural change, urban form and cycling in megacities, bicycle-public transport integration, bicycle network design, and remotely sensed urban indicators for bicycle studies.

The seminar was opened by the state secretary for transport and infrastructure, Mr Julio Lopes, who unfolded Rio de Janeiro's plans concerning non-motorised transport (Rio – Estado da Bicicleta), and was attended by the Brazilian resident representative of the Bicycle Partnership Programme (www.bikepartners.nl), Ms Giselle Xavier; the UFRJ pro-rector



CAN researchers cycling along part of the 144km cycle lane in Rio de Janeiro (photo Jeroen Verplanke)

of Planning and Development, Professor Carlos Antonio Levi da Conceicao; the director of academic affairs of the COPPE Faculty of Engineering of UFRJ, Professor Edson Watanabe; and the sub-secretary for transport of the municipality of Rio de Janeiro, Professor Romulo Orrico Filho.

In three sessions, six CAN PhD researchers presented their initial project outcomes, while CAN senior researchers gave presentations on research related to urban cycling in the various partner countries. Lastly, Dr Peter Cox, senior lecturer at the University of Chester in the UK and representing another academic cycling network (Cycling and Society, a network of international, though predominantly UK-based, scientists with a primary research interest in cycling), gave a short presentation on his work and that of the network he represented.

In the days before and after the seminar, CAN founding members organised a network meeting, various supervision meetings, as well as contributions to some sessions at World Urban Forum 5, which was being held at the same time in Rio de Janeiro. Of course, the week would not have been complete without the 10km bicycle ride along Copacabana beach followed by a cocktail with typical Brazilian caipirinhas!

Besides all this, ITC staff and CAN researcher Roel Massink travelled to Florianopolis in the same week and gave a presentation on the climate value of cycling at a small international seminar organised by the

Universidade Estadual de Santa Catarina and the Forum on Mobility in Cities (www.mobilidadenascidades.com.br).

The next (and closing) CAN event will be held in December 2010 in Cape Town, South Africa, completing the round of visits of CAN researchers. This time a scientific workshop will be organised and the results of the various research projects will be presented to a larger scientific audience. Several transport and planning professors from around the globe will be invited to contribute.

For more information on Rio – Estado da Bicicleta!: www.transportes.rj.gov.br/downloads/rio_estado_da_bicicleta.pdf



Presenters at the seminar (left to right): Professor Marianne Vanderschuren, Ms Deepthi Durgi, Ms Janice Kirner, Dr Mark Zuidgeest, Ms Flavia de Souza, Ms Giselle Xavier, Ms Himani Jain, Mr Mark Brussel, Mr Julio Lopes, Professor Milena Bodmer, Professor Martin van Maarseveen, Professor Carlos Antonio Levi da Conceicao, Mr Alphonse Nkurunziza, Professor Edson Watanabe, Mr Roel Massink, Mr Edward Beukes (photograph taken by Jeroen Verplanke; CAN presenters Professor Geetam Tiwari, Professor Dinesh Mohan, Professor Suely Sanchez not in photo)

partnership news

Third Lot 10 Erasmus Mundus Programme Board Meeting, Belize City

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Erasmus Mundus is a cooperation and mobility programme in the field of higher education. The programme's aim is to promote European higher education, to help improve and enhance the career prospects of students and to promote intercultural understanding through cooperation with third countries, in accordance with EU external policy objectives, in order to contribute to the sustainable development of third countries in the field of higher education.

The Faculty ITC is coordinating the Erasmus Mundus partnerships for Iran, Iraq and Yemen (www.erasmusmundus8.net) (Lot 8) and for Africa, the Caribbean and Pacific States (ACP) (www.erasmusmundus10.net) (Lot 10). The Lot 10 programme started in 2008 and by now most of the students have completed their mobility. The programme contributed considerably to the goal of improving and enhancing the career prospects of

students and staff by offering 177 mobilities (students and staff) from 31 different ACP countries the opportunity to study and live in six different European countries.

In February 2010, a meeting of the Lot 10 Programme Board took place in Belize City, organised by the University of Belize, one of the Caribbean partners in the programme. The main topics of discussion were how to forge even closer

cooperation for the future, especially through bilateral agreements for the transfer of course credits as well as multiple degree awards between the partners. The consortium also explored future funding mechanisms for cooperation. Mr Salord and Mrs Russell of the EuropeAid Cooperation Office participated in the meeting.

We would like to thank the University of Belize for organising this meeting.



Mr Salord and Mrs Russell of the EuropeAid Cooperation Office



Programme Board meeting Lot 10

events

GIS Education Reaching Grassroots in India: Students Conduct Cadastral Scale Mapping to Aid Local Governance

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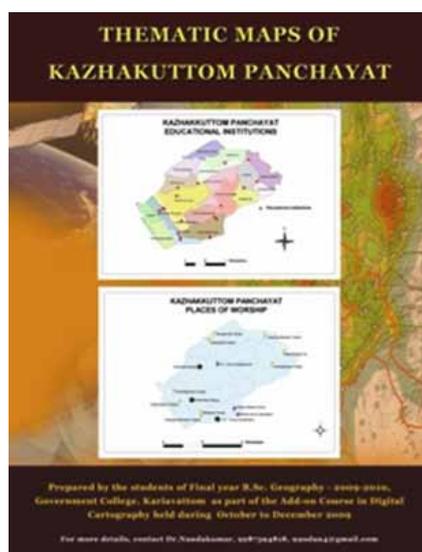
GIS is trickling down to grassroot levels in India. Although its application is widespread, the education facilities required to support the demands of this large country are still meagre, necessitating fraternal support from the geo-information science community all over the world. Despite the limitations in the available facilities, students from a city college used their newly acquired GIS skills to produce maps that will serve to aid local government in the betterment of governance.

A year ago, the students of the Department of Geography at Kariavattom Government College, Thiruvananthapuram, India, lacked basic skills in computer-based cartographic applications owing to inadequate funds and laboratory facilities. With financial support from the Directorate of Collegiate Education, Government of Kerala, a job-ori-

ented add-on course in digital cartography was initiated. Since the geography department had no lab equipped with computers and software, this course could be carried out only with support from University College and the Indian Institute of Information Technology and Management-Kerala (IITM-K), Technopark, Thiruvananthapuram. And so the course was launched with 26 students enrolled, who were mostly from the socially and economically weaker sections.

Map-making is one of the primary focuses in geographical education. Conventionally, field data are compiled and converted into diagrams and maps are drawn on paper. Modern geographers feed the same field data into digital formats and produce digital maps. The first batch of 26 students (who completed the course last month) excelled in digital

cartographic skills and they embarked on digitising and mapping Kazhakkuttom Panchayat (smallest administrative unit in India), to which their college belongs. They set out with a global positioning system (GPS) and mapped places of worship, education institutions, road and rail infrastructure, and the like. They collected census data, linked it to the spatial format and brought out thematic maps depicting population, working population, etc. Although Kazhakkuttom Panchayat is the centrepiece of Kerala's IT sector, housing India's first technology park (Technopark), which was inaugurated by the late prime minister P.V. Narasimha Rao, it lacked even a location map. The BSc geography undergraduates who undertook the digital resource mapping had only an old computer to work on, and the entire project was completed on a shoestring budget of Rs. 45,000 (less



The cover of the *Panchayat* Atlas that the students produced



Administrative Organization (Ward) Map

than 725 euros) before the map was handed over to the Kazhakkuttom Panchayat president, Sindhu Sasidharan. Some excerpts of the work are given below.

The local administration was very interested in the work carried out by the students and realised its value for effective governance. The students were elated to know that the local administration was keen to receive the results of their work.

On 22 February 2010, they presented the thematic maps produced to Ms Sindhu Sasidharan, president of Kazhakkuttom Panchayat, at Seminar Hall, Kariavattom Government College. The college principal, Dr Abdul Rahim, presided over the

function. While congratulating the students on their achievement, Mr Rubin D'Cruz, director of the Kerala State Institute for Children's Literature, read out a message from the Minister for Education, Government of Kerala. The course will continue in the years to come and we would like to request suggestions and support from the geo-information fraternity.



Students handing over the maps to Ms Sindhu Sasidharan, president of Kazhakkuttom Panchayat

Dr D. Nandakumar is head of the Department of Geography, Kariavattom Governmental College, Trivandrum. He did his PhD at the University of Victoria. Sekhar Kuriakose is a PhD student at the Department for Earth Systems Analysis at Faculty ITC, University of Twente.

Map Middle East Conference 2010

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Organised by GIS Development of India, the Map Middle East Conference is an international platform designed for building networks to enable g-lateral ties in the Middle East region for the geospatial community. It is aimed at encouraging professionals representing different stakeholders of the geospatial community to come together on a common platform and work on ways and means of encouraging geospatially related ties and collaboration at national, regional and global levels for the overall growth of the geospatial industry in the region. This year's event was held over the period 22-24 March at the National Exhibition Centre Abu-Dhabi.

This annual conference attracts a great many regional visitors from Oman, Saudi Arabia, Bahrain, Egypt, Lebanon and Kuwait, and to a slightly lesser extent from Iran, Iraq and Syria

– countries with whom ITC has had a long association and from where many ITC alumni have originated.

The United Arab Emirates is a rapidly growing nation, and vast infrastructure projects are in progress. Local organisations seek and employ large numbers of staff in the ITC knowledge fields. For many years the local UAE Military Survey Department, and more recently, the UAE Falcon Space Reconnaissance Centre, have utilised ITC for training its staff.

Local educational institutions and geo-information programmes are emerging to cater for the rapidly growing market. Foremost among these is the United Arab Emirates University, with its main campus situated at Al Ain (130 km west of Abu Dhabi, close to the border with Oman). It also has a centre in Abu Dhabi and is establishing its own

geoinformatics programme. ITC hopes to be able to collaborate with the UAEU to establish closer links both in education and research.

One of the invited keynote speakers at the conference was Drs Dorine Burmanje, president of EuroGeographics and chair of the Executive Board of the Netherlands Kadaster, who presented a session on geo-information for urban city development and the role of global spatial data infrastructure.

The United Arab Emirates launched its own remote sensing satellite, Dubai Sat-1, in July 2009, and, according to the operator, Emirates Institute of Advanced Science & Technology, this will stimulate considerable demand for training in earth observation applications. A second, more advanced satellite is due for launch in 2012.

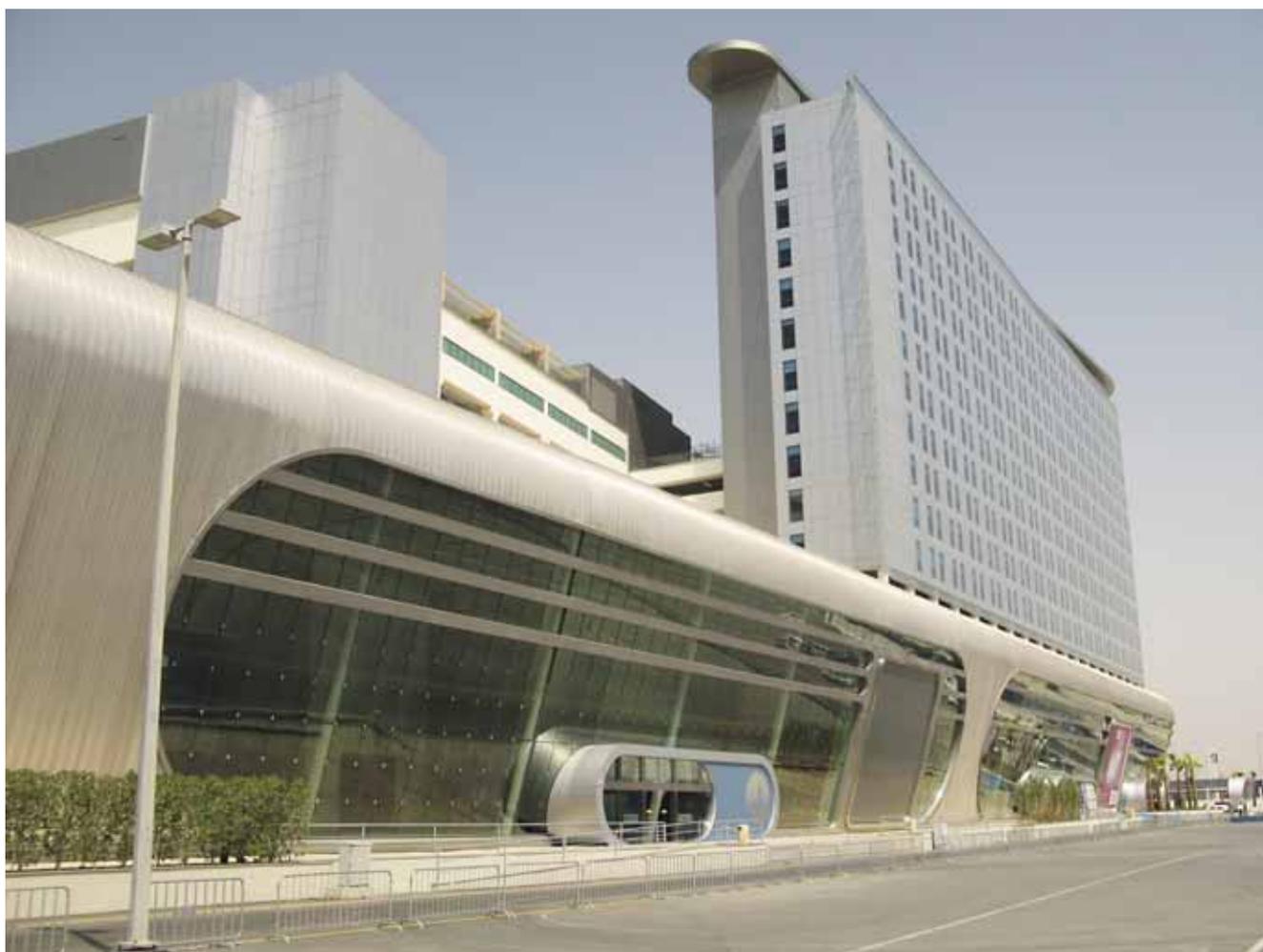
A good deal of interest in the ITC exhibition stand was evident, with many guests already familiar with our courses and research themes, plus a significant number of potential students or PhD candidates keen to know more about studying at ITC. The ITC programmes Geoinformatics, Applied Earth Sciences and Urban Planning and Management were especially popular.

The United Arab Emirates has a very large expatriate community, and many ITC alumni undertake long or short assignments there. We were delighted to welcome a number of international alumni at the conference, many of whom expressed interest in returning to ITC for short "upgrade" courses.

Similarly, a constant theme was the interest of potential students in undertaking distance education as opposed to conventional residential courses. Many local employers recognise the necessity of staff training but are reluctant to send staff abroad for long periods. The ITC Distance Education Programme caters for such situations, and enables specialised upgrade training to be undertaken without the need for potentially costly residential periods abroad.



ITC's John Horn with visitors at the exhibition stand at the Map Middle East Conference



Abu Dhabi National Exhibition Centre, venue of the Map Middle East Conference and Exhibition



Spring Party



March 2010

announcements

GEM 2010 Course

Five renowned European institutes are offering a unique Erasmus Mundus joint European Master of Science (MSc) course in Geo-information Science and Earth Observation for Environmental Modelling and Management (GEM). The course has a duration of 22 months and will be taught by world-class faculties in five countries: Iceland, UK, Sweden, Poland and the Netherlands. While spending time in at least two of these five countries and studying in a multicultural environment, students will gain valuable insight into the academic, social and cultural diversity of Northern and Central Europe. On graduation, they will be offered a multiple MSc degree from the consortium universities.

The course will start with a foundation year. Depending on their background and preference, students will start their studies either in the Netherlands (University of Twente, Faculty ITC) or in Sweden (Lund University). The overall content of this foundation year is similar at both universities but at ITC the focus is more on the interaction of society and technology related to environmental modelling and management, while in Lund the students receive more training in quantitative biophysical modelling. After the foundation year, students continue with MSc research, including fieldwork, on a topic of their choice at one of the other four universities.

For the course starting September 2010, we are inviting applications from motivated high-quality graduates from all over the world.



UNIVERSITY OF
Southampton



For more information: gem-msc@itc.nl.

For online application: www.gem-msc.org/application/Registration/



GEM graduates 2008-2010

Refresher Courses 2010

Refresher courses, which are certificate of attendance courses (mostly of two-week duration) organised for alumni in their home countries or regions, are meant to increase the impact and prolong the effect of earlier training.

Refresher courses are funded mainly by the Netherlands Fellowship Programme (NFP). In principle, the target group of these courses consists of alumni who have completed any NFP-funded training or education at least two years before the planned starting date of the relevant refresher course. Colleagues and supervisors of alumni are also allowed to participate in (part of) a refresher course.

In 2010 ITC will co-organise seven refresher courses:

- Participatory Approaches to Slum Upgrading and Management (Kenya)
- Modern Techniques for Environmental and Sustainable Development of Earth Resources (Ethiopia)
- GEONETCast Toolbox for Natural and Water Resource Management (Ethiopia)
- Preparing for Adaptations to Climate Change in West Africa (Burkina Faso)
- Strengthening Local Land Governance: Multi-Stakeholder Approaches (Tanzania)
- The Application of GIS and Remote Sensing to Geological Mapping and Mineral Resources Exploration (Tanzania)
- Modern Geo-Engineering Technology to Advance Environmental Management (Vietnam)

More information is available at www.itc.nl/Pub/Study/CourseFinder

staff news

Outstanding Achievement Award for Professor Bob Su

ITC News

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In 2009 Professor Bob Su received from the Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences (CAS), an Outstanding Achievement Award for his excellent contribution to the CAS International Partnership Programme entitled Basic Research for Water Issues of Inland River Basin in Arid Region.

The Heihe River Basin, an inland river basin located in the Hexi corridor of Gansu Province, was selected to study the formation of water resources in high mountains, the transformation of water resources in the

piedmont alluvial plain, the sustainable utilisation of water resources in the inland river basin, the management of water resources in the whole basin, and environmental issues relevant to the abuse of water resources. The study was initiated in 2005 and completed in mid-2009. Thanks to the great success of the project, especially the building up of the partnership between the domestic and overseas Chinese researchers, a new research programme entitled Integrated Research in Eco-Hydrological Processes in the Heihe River Basin is being initiated by the National Natural Science Foundation of China (NSFC) in 2010.

The programme objectives are to:

- establish a research platform integrating eco-hydrological processes research centred on water, through integrated observation, experiment, simulation, scenario analysis and decision support
- study eco-hydrological processes at individual plant, plant community, ecosystem, landscape and watershed scales, and the interactions
- quantify the ecosystem-hydrological process mechanism of inland river basins under the impacts of climate change and human activities
- develop methods for eco-hydrological process scaling

- develop coupled ecological, hydrological and socio-economic watershed models
- advance the understanding of inland basin water resources formation and transformation mechanisms and sustainable management
- advance Chinese watershed eco-hydrological research to an advanced international level.

The duration of the new programme is eight years and the total budget is 150 million Chinese yuan (approximately 15 million euros).



More information (in Chinese only) about the programme can be found at www.nsf.gov.cn/nsfc/cen/xmzn/2010xmzn/04/07.html

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life after itc

Alumni meet at 5th World Urban Forum in Rio de Janeiro

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In the space of a few short years, the World Urban Forum (WUF) has turned into the world's premier conference on cities. The United Nations Forum was established to examine rapid urbanisation and its impact on communities, cities, economies, climate change and policies. Since the first meeting in Nairobi, Kenya, in 2002, the forum has grown in size and stature as it travelled to Barcelona in 2004, Vancouver in 2006, and Nanjing in 2008.

With half the world population already living in urban areas, it is projected that in 50 years two-thirds of all people will be living in towns and cities. A major challenge for the forum is to find ways of minimising poverty in cities, to improve access of the urban poor to basic facilities such as shelter, clean water and sanitation, and to achieve environmentally friendly, sustainable urban growth and development.

UN-Habitat and the government of Brazil organised the fifth session of the forum, held in Rio de Janeiro from 22 to 26 March 2010, under the theme The Right to the City - Bridging the Urban Divide. The forum is an open and inclusive gathering. It brings together government leaders, ministers, mayors, diplomats, professionals, academics, as well as members of national, regional and international associations of local governments, non-governmental and community organisations, grassroots women's organisations, and youth and slum dwellers' groups, as partners working for better cities. Almost 14,000 participants from 150 coun-



Rio de Janeiro, Brazil

tries around the world attended the forum this year.

For the students and researchers at ITC involved in governance issues and in urban and regional planning, the WUF is a tremendous opportunity to learn about new policy directions and state-of-the-art developments. ITC has been present at most of the forums, giving networking and training events. ITC also had a booth at the exhibition in Rio and was responsible for one of the training events offered. Furthermore, ITC organised a side event to the WUF on behalf of the Cycling Academic Network (CAN; see page 16). There were many alumni from all over the world among the 14,000 participants. Traditionally, we meet many former students at the WUF who now work for planning ministries and municipalities. The ITC booth is always a happy gathering place for participants wishing to renew their



ITC booth at the 5th World Urban Forum

links with their Alma Mater, so ITC, together with CAN, hosted a reception on Thursday, 25 March 2010, at the restaurant "Espírito Santa" in Santa Teresa, a beautiful part of the city high up in the hills. About 30 people attended this informal gathering, including representatives from the Federal University of Rio de Janeiro (UFRJ), the Federal University of Rio Grande do Sul (UFRGS) and UN-Habitat; CAN researchers and senior scientists from Brazil, India and South Africa; and a good number of



CAN/alumni reception with the consul-general



CAN/alumni reception



Concrete pillars supporting the hillsides around Rio de Janeiro

alumni. The audience was very honoured to welcome among the guests the consul-general of the Netherlands, Mr P.R.J. Comenencia, and the transport secretary of the municipality of Rio de Janeiro, Mr Romulo Orrico Filho.

The 5th World Urban Forum drew to a close on 26 March with many speakers, including US Secretary of State Ms Hillary Clinton, hailing it as the most successful ever. The next forum will be held in Bahrain in

2012. Although the forum ended in good spirits, the festive atmosphere in Rio ended abruptly a few days later. Almost immediately after the guests had departed the city, a terrible disaster struck. Hillsides came tumbling down and streets were flooded owing to extremely heavy rainfall. At the forum, the focus was mainly on providing sanitation and services to upgrade cities, with discussions on slum upgrading with respect to risk and vulnerability more in the background. The destructive

flooding and landslides, however, propelled these topics to the forefront of discussion. Many parts of the hillsides around Rio de Janeiro are supported by concrete columns. The fact that the city has unstable hillsides is well known, but nevertheless many people seek to build their homes in the favelas located on these slopes. This recent disaster in Rio is therefore a harsh reminder of the urgency with which these urban problems must be addressed.

Siti Nurbaya: Pioneer in Her New Environment

Source: Ridwan Max Sijabat, The Jakarta Post

www.thejakartapost.com

As the first woman to hold the position of secretary-general of the Regional Representatives Council, Siti Nurbaya Bakar is a rare player in Indonesian politics, setting an example for women across the country.

Despite her political career peaking at a level below that of female world figures such as the Argentinian president Evita Peron, Britain's former prime minister Margaret Thatcher or the late former Indian prime minister Indira Gandhi, she is proud of being an Indonesian woman and of what she has achieved throughout her

three-decade career as a civil servant. She is also proud that Indonesia affords women, including former president Megawati Soekarnoputri, equal opportunity to play a role in politics – more so than even the male-dominated political landscape of the US.

“More and more female figures are emerging to show their capacity to be more than household managers in almost all aspects of life. Compared with other developing countries, this predominantly Muslim country is leaping forward in the development of gender equality. The key problem

is equal opportunity. Everyone can develop and realise spectacular achievements if given the chance,” Siti told The Jakarta Post.

Siti (54) began her career in 1979 as an agricultural campaign specialist in the Lampung provincial government. There she developed her passion for bureaucracy through the unique experience of being the first woman in her new work environment. Some might say that Siti's appointment as secretary-general of the Council by President Susilo Bambang Yudhoyono in 2004 was purely inci-

dental and opportunistic. But history shows that she had experience in positions of leadership, with Megawati entrusting her with the number two position at the Home Ministry from 2001 to 2004.

"I was the first holder of a master's degree among civil servants in 1988 and the first holder of a PhD among bureaucrats in 1998. After that, more and more civil servants received scholarships to undergo postgraduate and doctorate programmes at home and abroad," said Siti, who earned her master's at ITC in the Netherlands and her PhD at the Bogor Institute of Agriculture.

Siti enjoys the challenges that have been thrown at her throughout her steadily advancing career, seeing them as chances to be more creative and innovative in serving the public and helping to improve people's welfare.

"I've learned that life is a continuous challenge of innovation and the curriculum of life is whether the targets are reached or not. To be the first in something is most definitely memorable," she said. According to Siti, her success stems from her ability and willingness take risks, while not being afraid to make mistakes in pursuing these "innovations".

She also said that she was nominated for the post of home minister in 2000 and 2004, but turned it down in favour of remaining part of the

country's bureaucracy. "Just last November, two ministers offered me a position as special assistant, but I was not interested in the offer because the Council still needs me to build the capacity of the new legislative institution," she explained, adding that with the unpredictable political climate it was a good time to work in the Cabinet.

Since becoming secretary-general, Siti has pioneered the hiring of fresh university graduates (instead of importing old staff from ministries and state agencies) to help polish the Council's image and improve its productivity. "Now we are moving to build Council branch offices in all 33 provinces, a project that needs be completed by next year. So far, everything has progressed smoothly and transparently and no complaints have emerged," she said.

During her tenure at the Home Ministry in 2002, Siti came up with the idea of introducing a minimum quota of 30% in regard to women's positions in political parties and legislative elections. "I got the idea from Argentina's political laws, the outcome of the long fight by the Peronist party. As a result, we're getting more and more women in parliament. Although women and children do not yet play a key role in the law-making process, law-makers should bear in mind that women are the most vulnerable to discrimination under these laws," she said.

She is also deeply concerned over the disappearance of government-sponsored, grassroots social movements, such as the integrated service posts (Posyandu) and the dissolution of family-planning centres. This, she says, has contributed to the high infant and maternal mortality rates. "The poverty that afflicts 39 million people must also be quickly alleviated to control the rapid population growth and the high infant and maternal mortality rates."

She acknowledged that political experience has made her more mature in executing her tasks and has increased her responsibility in the bureaucracy. Since her employment as a civil servant in Lampung, she has played an active role in the Golkar Party-affiliated Indonesian Younger Generation for Reform (AMPI), and even chaired the mass organisation in 1993. "Bureaucracy is a training ground for would-be politicians. A bureaucrat must be able to perform administrative functions, prepare necessary policies, articulate the people's aspirations and maintain political stability."

When asked what motivated her to work hard in developing her career, Siti said she was obsessed by the challenge to prove that the harassing adage she had heard during her study in the Netherlands was absolutely wrong. "It said that, whatever women do, they must do it twice as well as men to be thought half as good. This has now been proved wrong by many Indonesian women," she said, citing the fact that during the 30 years she had worked in the bureaucracy she had never taken any leave other than maternity leave to give birth to her two children.

Siti has criticised the ongoing reform in the country's bureaucracy, which she says has not yet produced progressive bureaucrats. "The reform should focus not only on revamping the system but also on internalising values to change bureaucracy's mindset. The bureaucracy is the backbone of the government and national development and therefore it needs creative and innovative officials and staff to improve the public service." According to Siti, civil servants must be able to internalise the noble values of public life, leaving selfishness behind, and display integrity, objectivity, accountability, openness, honesty and leadership in their service to the public.



Dr ir Siti Nurbaya