ASNEngr

American Society of Nepalese Engineers

'Together we CAN Develop'

Proceedings/Book of Abstracts

of

2013 Joint ASNEngr/CAN-USA Annual Conference

(6th ASNEngr Annual Conference and Meeting and 6th CAN-USA Annual Development Conference)

"Engineering, Science and Technology for a Better Living"

Edited by

Pradeep Khanal and Ramesh B. Malla, Ph.D.

Foreword and Acknowledgments

The American Society of Nepalese Engineers (ASNEngr) and Computer Association of Nepal-USA (CAN-USA) held their sixth joint Annual Conference on June 29, 2013 at Intel's headquarters in Santa Clara, California, U.S.A. The conference was hosted by CAN-USA. The Conference was attended by about 70 participants, including practicing engineers, scientists, technologists, academicians, students, and industry leaders. The conference drew participants and speakers from the U.S., Malaysia and Nepal.

The conference, with the theme "*Engineering, Science and Technology for a Better Living,*" deliberated on how state-of-the-art knowledge in Engineering, Applied Science & Disaster Communication such as Information and Communication Technology, Bio-Sciences, Medicine & Engineering Technology could be used to solve the problems in developed as well as developing countries including Nepal.

Three distinguished guests presented the conference opening remarks. First of all, Joint Secretary of Ministry of Science, Technology and Environment, Mr. Shankar Prasad Adhikari, speaking from Kathmandu, Nepal via Skype, highlighted Nepal Government's Information and Communication Technology (ICT) policies and several important developments that are taking place in this sector in Nepal. He called upon all Nepali diaspora, irrespective of where they are located, to make attempts to contribute their best to the growth and enhancement of engineering and scientific research, development, and education in Nepal and wished the attendees to have successful conference. Next, Mr. Binod Dhakal, President of Computer Association of Nepal (CAN), also joining from Kathmandu, indicated that the government of Nepal had setup a task force to develop business process outsourcing policy, and added that the implementation of this policy would further help spur Nepal's economic development. Then Mr. Bimal Sharma, Founding President of CAN and President of Center for Information Technology (CIT) in Kathmandu, Nepal delivered special remarks in person at the conference saying that only heavy investment in knowledge, innovation, and collaboration could aid a growth in Nepal. He also expressed confidence that this Joint ASNEngr/CAN-USA Conference would be able to address some of the problems Nepal is currently facing in the ICT and development sectors.

The keynote speech by Arlene Blum, Ph.D. on "Breaking Trail: Mountains and Molecules." Dr. Blum highlighted her journey from the undergraduate chemistry laboratory at the Reed College in Portland, Oregon to breathtaking mountains including Himalayas to the University of California, Berkeley from where she received Ph.D. in biophysical chemistry. She also highlighted how her manuscript, co-authored with Professor Bruce Ames, "Flame Retardant Additives as Possible Cancer," written at the Everest basecamp in Nepal, was instrumental in banning Tris and Fyrol, two cancer-causing chemicals, that were used as a flame retardant on children's sleepwear.

The conference featured four technical sessions with 19 presentations among which five were

presented from Nepal via Skype. The sessions included *"Joint ANMF/ASNEngr/CAN-USA initiative on Earthquake Preparedness and Disaster Relief in Nepal," "Applied Science & Disaster Communication," "Bio-Sciences, Medicine & Engineering"* and *"Connecting with Nepal."* Each of these sessions featured individual presentations discussion and sharing of scientific and engineering knowledge and innovative social initiatives among participating engineers, scientists and professionals. The presenters and participants came from a broad base of the academia, government agencies, and private and multinational industries.

Furthermore, ASNEngr held its 2013 Annual General Membership Meeting in which reports on the Society's multiple activities and accomplishments, including establishment of four engineering student scholarships in Nepal, were presented and the Society's future short and long term activities, plans, and other areas of interest were discussed.

The conference was concluded with the ASNEngr/CAN-USA Networking Mixer in the evening, consisting of speakers and dinner. This evening program featured three speakers: Mr. David Sowerwine, VTS Founder & President and Mr. Skip Stritter, VTS Technology Director & Chairman of the Board, both from San Francisco, CA, and Mr. Bimal Sharma, Founding President of CAN and President of Center for Information Technology (CIT), Kathmandu, Nepal. Messrs. Sowerwine and Stritter presented on their Looma project: an interactive computer system (hardware and software) that would potentially bring internet-scale knowledge, inspiration, and new dynamics to classrooms worldwide. Finally, Mr. Sharma highlighted how CIT was effectively using technologies in solving the problem of digital divide in Nepal. He explained that by working together innovative way with many organizations, CIT has been able to accomplish technological based surveys, technical trainings, establishment of tele-centers and software development in remote parts of Nepal.

Amid warm hospitality and flawless execution by the Conference Organizing Committees the highly successful 2013 Joint ASNEngr/CAN-USA Annual Conference ended on a very high note with lots of enthusiasm and momentum for the next year's conference.

ASNEngr and CAN-USA extend their sincere thanks and gratefully acknowledge many hours of voluntary time and efforts contributed by the members of the various Conference Organizing Committees (with special appreciation to members of the Local Organizing Committee) and the generous support provided by all the sponsors to make the event a grand success. Following corporations sponsored the event by providing direct or in-kind support: Intel Corporation, Santa Clara, CA; Casa Azteca, Milpitas, CA; Third Eye Travel, Fremont, CA; Microsoft Corporation, Seattle, WA; and John Hancock, Charlotte, NC. Ms. Samana Ghimire served as the master of ceremony of the entire program. Her contribution to the Conference in this capacity is gratefully acknowledged.

Last but not least, ASNEngr and CAN-USA express their deep appreciations to authors/presenters and conference attendees without whose participation the Conference would not have been possible.

More information on this year's and past years' conferences can be found on the ASNEngr website at http://www.ASNEngr.org and the CAN-USA website at http://www.can-usa.org.

With warm regards,
July, 2013

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Overall Program Schedule- At-a-Glance

Saturday, June 29, 2013

8:30 AM   ***On-Site Registration/Breakfast***

9:00 AM – 9:45 AM   ***Conference Opening***

9:45 AM – 11:00 AM   ***Technical Session I***

    Session Title: *Joint ANMF/ASNEngr/CAN-USA Initiative on Earthquake Preparedness and Disaster Relief in Nepal*   ***(5 presentations)***

11:10 AM – 12:25 PM   ***Technical Session II***

    Session Title: *Applied Science & Disaster Communication*   ***(5 presentations)***

12:25 PM- 1:40 PM   ***Lunch*** *(provided)*

1:40 PM – 2:30 PM   **Keynote Lecture on** *"Breaking Trail: Mountains and Molecules"* **– Arlene Blum, Ph.D.,** Green Science Policy Institute, Berkeley, CA

2:30 PM – 3:30 PM   ***Technical Session III***

    Session Title: *Bio-Sciences, Medicine & Engineering*   ***(4 presentations)***

3:40 PM – 4:55 PM   ***Technical Session IV***

    Session Title: *Connecting with Nepal*   ***(5 presentations)***

5:00 PM – 6:00 PM   ***ASNEngr General Membership and BOD Meeting***

6:00 PM – 10:00 PM   ***Networking Mixer*** *(dinner included)*

Detail Program Schedule

Saturday, June 29, 2013

Registration/Breakfast   8:30 AM

Conference Opening   9:00 AM – 9:40 AM

Conference Welcome and Organization Introduction –

by **Amod Pokhrel**, **Ph.D.,** Conference General Co-Chair and President, Computer Association of Nepal-USA (CAN-USA) and **Rajendra K. Shrestha, Ph.D**. Conference General Co-Chair and President, American Society of Nepalese Engineers (ASNEngr)

Special Welcome Remarks –

Shankar Adhikari, *Act. Secretary,* Ministry of Science and Technology, Nepal

Binod Dhakal, *President,* Computer Association of Nepal (CAN)

Bimal Sharma, *Founding President,* Computer Association of Nepal (CAN)

Conference Program Overview –

*b*y **Pradeep Khanal**, Conference Technical Co-Chair and Vice President, CAN-USA and **Ramesh B. Malla, Ph.D.** *,* Conference Technical Co-Chair, Founding President, ASNEngr

Local Organizing Committee Welcome –

by **Bineet Sharma,** Chair, Local Conference Organizing Committee and Founding President, CAN-USA

Technical Session I   9:45 AM – 11:00 AM

 Session Title: *Joint ANMF/ASNEngr/CAN-USA Initiative on Earthquake Preparedness and Disaster Relief in Nepal*

Session Chairs: Bimal Sharma, Founding President, CAN and **Binod Tiwari, Ph.D.**, California State University, Fullerton, CA

9:45 AM – 10:00 AM

"General Overview of the Joint ANMF/ASNEngr/CAN-USA Initiative on Earthquake Preparedness and Disaster Relief in Nepal" by **Ramesh B. Malla, Ph.D**., Founding President, American Society of Nepalese Engineers (ASNEngr) and Chair, Committee on Joint *ANMF/ASNEngr/CAN-USA Initiative on Earthquake Preparedness and Disaster Relief in Nepal*; University of Connecticut, Storrs, CT.

10:00 AM – 10:15 AM

"Use of IT tools for training professionals in the municipalities" by **Amod Mani Dixit, Ph.D**., National Society for Earthquake Technology - Nepal (NSET), Kathmandu, Nepal

10:15 AM – 10:30 AM

"Role of IOM Smart Health line in providing medical services in rural areas of Nepal" by **Dr. Pradeep Vaidya**, Director, Department of Information Technology, IOM and Prof. and Unit Chief, GI and HBP Surgery, Dept. of Surgery, TUTH. Kathmandu, Nepal

10:30 AM – 10:45 AM

"Logistic Contingency Planning for Seismic Emergency in an Urban Settlement" by **Upama Ojha,** Department of Civil Engineering, Institute of Engineering, Pulchowk, Nepal

10:45 AM – 11:00 AM

"Experiences of Dharan Municipality on Building Code Iimplementation" by **Suraj Shrestha,** Dharan Municipality, Dharan, Nepal

Break   11:00 AM – 11:10 AM

Technical Session II   11:10 AM – 12:25 PM

Session Title: *Applied Science & Disaster Communication*

Session Chairs: Kishor Panth, Cisco Systems, Kathmandu, Nepal; and **Achyut Shrestha,** Suraj Green Tech (SGT.com.np), Phoenix, Arizona

11:10 AM - 11:25 AM

"Remote Sensing Using Quadcopter" by **Sanjeeb Pandey, Ph.D.,** Institute of Engineering, Pulchowk, Nepal.

11:25 AM – 11:40 PM

"Use of Soil Reinforcement Panel to Reduce Seismic Ground Motion" by *Binod Tiwari, Ph.D.,* California State University, Fullerton, CA

11:40 PM - 11:55 PM

"Creating Synergy From Chaos: Implementing the WHOLE OF SOCIETY approach to address challenges of post-disaster communications focusing on Leadership, Innovation, & Collaboration" by *Pat Lanthier,* Advisor, US Pacific Command and Chairman, Emergency Communications Leadership & Innovation Center, Carnegie Mellon University Silicon Valley

11:55 AM – 12:10 AM

"*Communicating after a Disaster in Nepal (A review of the Diaspora's involvement and possibilities for the future)*" by *Suresh Ojha*, Disaster Preparedness Committee Chair, CAN-USA, Santa Clara, CA.

12:10 PM - 12:25 PM

"*Dynamic Response of a Simply Supported Bridge under a Moving Vehicle Using MATLAB/Simulink*" by *Fatih Avcil and Ramesh B. Malla, Ph.D*. , University of Connecticut, Storrs, CT, U.S.A.

Lunch Break (provided)   12:25 PM -1:40 PM

Keynote Lecture: "*Breaking Trail: Mountains and Molecules"*   1:40 PM – 2:30 PM

Arlene Blum, Ph.D. , Green Science Policy Institute, Berkeley, CA

http://en.wikipedia.org/wiki/Arlene_Blum

Award Presentation: CAN-USA 2012 Volunteer of the Year Award to *Mr. Rob Rowlands*, Walnut Creek, CA

Technical Session III   2:30 PM – 3:30 PM

Session Title: *Bio-Sciences, Medicine & Engineering*

Session Chairs: Nabin Acharya, Dell Systems, San Jose, CA; and **Suresh Ojha**, National Instruments, Santa Clara, CA

2:30 PM – 2:45 PM

"Extracellular Matrix (ECM) in Our Tissue Structure" by *Bikram Sharma, Ph.D.,* Postdoctoral Research Fellow, Stanford University, Palo Alto, CA

2:45 PM – 3:00 PM

"Tele-Medicine in Nepal" by *Prabhat Adhikari, MD,* Fresno, CA

3:00 PM – 3:15 PM

"Single Domain Antibody in Diagnosis and Therapy of Cancer and Infectious Disease" by *Toya Nath Baral.,* Merck, Palo Alto, CA

3:15 PM – 3:30 PM

"Indoor PM2.5 in Household Kitchens of Bhaktapur, Nepal, Monitored with an Inexpensive Light-Scattering Monitor" by *Amod K Pokhrel, Ph.D.,* University of California, Berkeley, CA

Break   3:30 PM – 3:40 PM

Technical Session IV   3:40 PM – 4:55 PM

Session Title: *Connecting with Nepal*

Session Chairs: **Nabin Khanal**, Microsoft Corp, Seattle, WA**,** and **Ramesh B. Malla, Ph.D.,** Founding President, ASNEngr; University of Connecticut, Storrs, CT

3:40 PM – 3:55 PM

"Research and Education Network in Nepal" by *Kishor Panth,* Cisco Systems, Kathmandu, Nepal

3:55 PM - 4:10 PM

"Dayitwa, Nepal Public Service Fellowship" by *Pradeep Khanal,* Intel Corporation, Santa Clara, CA

4:10 PM – 4:25 PM

"Design and Development of Mobile Devices in Nepal: Scope and Possibilities", by *Pramod Poudel,* Intel Corporation, Folsom, CA

4:25 PM – 4:40 PM

"Electric Vehicles from old Petrol/Gas Engine Conversions in Nepal" by *Achyut Shrestha,* Suraj Green Tech (SGT.com.np), Phoenix, Arizona

4:40 PM – 4:55 PM

"Think Different Nepal – A Techie Approach to Connect and Develop Nepal & Nepali Diaspora" by *Jay Mandal*, Los Angeles, CA.

ASNEngr General Membership Meeting.　　5:00 PM – 6:00 PM

Annual General Membership Meeting of the American Society of Nepalese Engineers (ASNEngr)

Networking Mixer (includes dinner)　　6:00 PM – 10:00 PM

(Casa Azteca, 20 N Abel St, Milpitas, CA 95035)

Presentations Titles and Speakers

Presentation I

Looma by *David Sowerwine and Skip Stritter,* San Francisco, CA

Presentation II

Center for Information Technology, Nepal by *Bimal Sharma, CIT,* Kathmandu, Nepal

Technical Presentation Abstracts

Use of IT tools for training professionals in the municipalities

Amod Mani Dixit, Ph.D.[1]

National Society for Earthquake Technology – Nepal (NSET), Kathmandu, Nepal

ABSTRACT

Majority of the buildings in Nepal are constructed without following the stipulations of national builindg code and hence are extremely vulnerable to earthquakes. Most municipalities are not capable to exercise effective control over the building permit and building inspection processes due to lack of appropritae mechanisms and lack of capacities for building code implementation. Lack of awareness among the population is another reason for the failure of building code enforcement.

Realizing this, the National Society for Earthquake Technology – Nepal (NSET) has conceptualized a program for assisting municipalities in effective building code implementation. The program focuses on assisting the municipal governments in enhancing their capacities to develop and administer the building permits and control system for ensuring improved seismic performance of all new building construction. This entails, on one hand, to develop an effective mechanism for building code implementation, and on the other hand, enhance earthquake awareness of the residents and technical knowledge of the municipal officials, technical professionals on aspects of earthquake risk management including earthquake-resistant design and construction.

This is proposed to be achieved by conducting a series of training courses for technical personnel, contractros, masons and general public. The demand for training programs in the municipalities is huge and the available resources are limited. Also, massive number of training programs is required in a shortest possible time to enhance the effectiveness and get scale-effect. In this context, NSET has conceptualized use of IT tools for conducting the training programs. Video conference and tele conference systems togther with VSAT technology are being used to deliver training sessions from Kathmandu to municipalities and even remote rural areas.

This paper discusses the concepts, methodology, and expected results of the capacity building program.

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[1] Executive Director, National Society for Earthquake Technology-Nepal (NSET), Nepal; adixit@nset.org.np

Role of IOM Smart Health line in providing medical services in rural areas of Nepal

Pradeep Vaidya, Ph.D.
Department of Information Technology
Tribhuvan University Teaching Hospital, Kathmandu

ABSTRACT

Health hotlines (medical call centers) play an important role particularly in preventative medicine and disease diagnosis, strengthening over-burdened health facilities or non-existent health facilities and healthcare service delivery, especially in developing countries.

From 1st Baishak 2068 (14th April 2011), Smart Cell officially launched IOM Smart Health line, a medical telephone interactive service in partnership with Institute of Medicine (IOM) Teaching Hospital (Maharajgunj). This service has been staffed by trained and experienced health professionals and is exclusive to Smart Cell and Smart Sat subscribers. Subscribers can consult with IOM doctors anytime (except on Saturdays and public holidays) from 8am to 8 pm.

The objectives of the Health line are: to improve access to health information and advice, to educate people on self-care and symptom management, to make quality health care advice available to all, especially those for whom cost has been a barrier to accessing services to bridge the need gap prior and post doctor patient interaction.

We are the first kind of such services provided in Nepal in partnership between private mobile operator and premier health institution of the country. We were also listed by the GSMA as the only recognized health line in Nepal. There is a huge market need for telemedicine interactive services in Nepal where the doctor-patient ratio is very low.

A study done showed that mostly males used it often; most smart phone user did not know of the service, those that used, most (53%) told that they benefited from the consultation and was effective.

In future, there is need to integrate with existing health services, where possible, use video tele-medicine so that there is more interactive consultation, and provide 24 x 7 service and endorsement by government.

1Director, Department of Information Technology, IOM and Prof. and Unit Chief, GI and HBP Surgery, Dept. of Surgery, TUTH. Kathmandu, Nepal, Email: praidya@yahoo.com

Logistic Contingency Planning for Seismic Emergency in an Urban Settlement

Upama Ojha[1]**, Samjhana Shrestha**[2]**, Salouna Sthapit**[3] **and Jiba Raj Pokharel**[4]
Department of Civil Engineering, Central Campus, Institute of Engineering,
Tribhuvan University, Nepal

ABSTRACT

Logistics planning in emergency situations involves dispatching commodities like medical materials and personnel, specialized rescue equipment and rescue items, food, etc. to distribution centers in affected areas as soon as possible so that relief operations are accelerated. In this study, a planning model for logistic preparedness regarding seismic disasters in two wards of Kathmandu, ward number 13 and ward number 20 is developed. The model addresses the vulnerability and risk imposed and logistic resource assessment. Assessment deals with the probability of loss of life and infrastructures in the area of study, transportation problem that needs to be solved at given time during ongoing aid delivery and gap between the logistics resource capacity available and required of the area (in terms of water, food, shelter, health and sanitation).

Finally, a plan for organized relief logistics for quick dispatch under severe constraints is modeled. The whole project is planned taking into consideration the study area to be an independent entity and assessment was carried out entirely focused in its internal resource capacity and gaps.

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[3]Central Campus, Institute of Engineering (IOE), Tribhuvan University, Nepal; Email: salounas@gmail.com
[4] Professor, Central Campus, Institute of Engineering (IOE), Tribhuvan University, Nepal

Experiences of Dharan Municipality on Building Code Implementation

Suraj Shrestha[1]

Dharan Municipality, Dharan, Nepal

ABSTRACT

Dharan is one of the major towns of Eastern Development Region with a population density ranging from 26- 226 persons/ hectare which is expected to increase to 57-272 persons/ hectare by 2031 A.D. Last ten years data of Building Permit Issuance shows a gradually increasing trend from 457 to 606 permits/ year. These buildings were constructed without taking earthquake risk into consideration. The town is expected to have an earthquake of intensity up to IX MMI. 1988 Udayapur Earthquake and 2011 Himalayan Earthquake have claimed many lives of the town. The underlying risk forced the municipality to adopt National Building Code from August 22, 2007 and is the third municipality to implement it. Today it is the pioneering municipality of Nepal and has set an example in implementing the building code most effectively.

Dharan Municipality followed a step-by-step approach starting by improving the quality check on the drawings. Meanwhile trainings on earthquake resilient buildings were given to masons and local builders. In 2008, the municipality took the process outside of the city hall walls, and worked on field implementation by making requests and appeals. The process really took off in 2009, when the municipality introduced a licensing system for local builders and masons. Builders would only be allowed to register with the municipality once they had completed four-day training in earthquake safe building. Although the licensing program was very successful in the beginning, problems arose after a few months, when the municipality was unable to increase the monitoring rate. To solve this problem, the municipality introduced a reward and punishment system; builders breaking the rules could from now on be suspended or even delisted from the municipal registration. Home owners could be fined up to 100,000 rupee (approx. 12,300 USD) or would not receive a certificate of completion. Masons and builders who followed the rules, on the other hand, could be rewarded with certificate of honor and would be announced publicly on the yearly Earthquake Awareness Day. The municipality in 2010 decided to simplify the Mandatory Rules of Thumb to five point checklist so that it would be easier to check for compliance for municipal staff. The only stakeholder that hadn't been addressed extensively yet was the home owners. Therefore, the municipality from 2011 started to organize orientation meetings for house owners who had recently applied for a building permit. Home owners now also had to be physically present when registering the building permit, so municipal staff could give a short briefing on requirements under the building code. From 2013, every Friday a team comprising of municipal staffs and Local Builders Association carries out field inspection to further enhance the compliance rate.

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Remote Sensing Using Quadcopter

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ABSTRACT

Remote Sensing is an emerging research field with numerous application areas. This project builds a quadcopter that is capable of implementing remote sensing. The term remote sensing is used here in a sense that it can obtain information from its surrounding that is not accessed easily by human beings. The quadcopter designed for this purpose, is a lightweight device made up of aluminum. It is capable of hovering itself in air and acquiring certain data from its vicinity.

The system itself has the weight of 1540 grams supporting 500 grams of payload within safety limits even though it can bear a weight of 3000 grams. The quadcopter when powered by a standard Lithium-Polymer battery of 5500mA-hr offers a flight time of 25 minutes safely. The system will be able to balance itself even during turbulent conditions with the help of control signals provided by the operator from the ground station. The communication between the base station and the quadcopter is obtained through wireless module.

The system obtains data about its current position and accurately predicts its state by implementing proper filtering of the attitude (pan, tilt and yaw) of the system and control algorithms like Proportional Integral Derivative (PID) and/or Fuzzy logic. The system is equipped with different sensors so as to measure the environmental parameters like temperature, atmospheric pressure and height from the sea level. These parameters are useful in determining the condition of the surrounding that it will be exposed to. The acquired values are transmitted through wireless system. Similarly, the quadcopter is also equipped with a camera module which gives the aerial view of its surrounding. This can be quite useful for surveillance and monitoring purposes.

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Use of Soil Reinforcement Panel to Reduce Seismic Ground Motion

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ABSTRACT

Loose sand samples were compacted in a 1.2 m x 1.2 m x 1.2 m size Plexiglas container to a depth of 0.6 m and at the relative density of 12%. Triaxial accelerometers were installed at the center of the model at the depth of 15, 30, 45, and 60 cm from the base of the container. The models were shaken with sinusoidal motions of 1, 2, and 3 Hz frequency and a wave motion recorded at a station #90095 during the 1994 Northridge Earthquake. The central portion of the soil was replaced with 30 cm deep annular shaped soil-cement panels – first at 10% and then with 25% replacement ratios. Moreover, the improved and unimproved models were shaken with sinusoidal motions of frequencies ranging from 1 to 4 Hz at 0.25 Hz interval to evaluate the fundamental frequency of the model. In addition to it, seismic accelerations were also recorded on top of 50 cm tall structure.

The study result shows that the ground amplification in the unimproved site ranged from 1.6 to 2.37, depending on the frequency and characteristics of the wave motion. The improved soil profile with an introduction of soil-cement panel at the replacement ratios of 10% and 25% could reduce the seismic ground amplification by 11% and 27%, respectively. Likewise, the soil improvement with the application of soil-cement panel at 25% replacement ratio could increase the fundamental frequency of the model profile by 0.25 Hz.

Results of this research show that installation of soil-cement mix panels is a viable option to reduce the seismic amplification factor in loose sand deposits.

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Creating Synergy From Chaos: Implementing the WHOLE OF SOCIETY approach to address challenges of post-disaster communications focusing on Leadership, Innovation, & Collaboration

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ABSTRACT

Disasters create chaos for both victims and HA/DR (Humanitarian Assistance/Disaster Relief) personnel. Scores of groups typically respond to a disaster scene and they all need (strive) to communicate using a variety of technologies and approaches. Results from the field repeatedly show that these attempts are uncoordinated, inefficient, and fraught with unintended consequences (such as radio interference blocking important transmissions, information sharing thwarted by organizational "silos", etc.). However, with the proper implementation of a "Whole of Society" approach to HA/DR communications, the former chaos can be transformed into synergy …using the simple formula: S = LIC (Synergy = Leadership + Innovation + Collaboration). Note that Synergy occurs when 1+1=3, or more!

This research represents decades of work in ICT (Information and Communications Technology) applied to HA/DR. However, much recent work (2007-2014) focuses on HA/DR ICT efforts in the Asia/Pacific region. Note that both the notorious "Ring of Fire" and repeated major weather events impact Asia/Pacific; the region with 70% of the world's disasters.

In the present investigation, three topic areas are presented: Leadership, Innovation, and Collaboration. Leadership requires a clear understanding of the context (both current ground truth and solution possibilities). Alvin Toffler declares that we are in a new wave of civilization…the Information Age...and, blind men (poor leaders?) are trying to stop it. The Cal Economic Strategy Panel describes our New Economy as: Fast, Global, Networked, and Knowledge Worker-dependent. Effective HA/DR leaders will internalize such insights and create synergistic solutions such as previously implemented in California via the ICT program (ROMP) that upgraded statewide communications and helped (synergistically) to enable about a half million jobs.

Innovation in HA/DR ITC is at an all-time high! There has never been a better time than now to innovate in the HA/DR space. Wireless (in all forms) coupled with social media, IM/KM (Info & Knowledge Management), UDOP (User Defined Operational Picture), wearable ITC (Incident Aide Systems), UAVs (Unmanned Aerial Vehicles), and Democratized Innovators (Lead Users, per MIT's Eric von Hippel) are just a few examples .

Collaboration is the "secret sauce" of synergy and the "Whole of Society" (WOS) approach. WOS was collaboratively produced by APEC (Asia Pacific Economic Cooperation) in November, 2011, to "strengthen regional disaster risk reduction and resilience" and "save lives, ensure economic vitality & human well-being". Several years prior, the MCIP (Multinational Communications Interoperability Program) was created by USPACOM (U.S. Pacific Command) to assist Asia/Pacific countries as they plan for HA/DR ITC. The program (perhaps the world's largest such collaborative HA/DR ITC program)

now includes 23 countries in a multinational and multi-entity effort with four planning activities per year that includes military, UN, NGOs, Gov't, industry, and academia. The next major 2-week program, called Pacific Endeavor '14 will be held in Nepal in August. Nepal has been an active collaborator in MCIP and more…a unique collaboration between Nepal, Singapore, USPACOM, MCIP, Carnegie Mellon and Tribuvan Universities, and CAN-USA successfully developed and demonstrated the first Emergency Radio network connection to the Singapore Operations Center and, later, to the US MARS system. Further collaborative work with Nepal continues. Another key collaboration is the PTC (Pacific Telecommunications Council) Emergency Comms Workshop, January, Oahu - Chaired by P. Lanthier.

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Communicating after a Disaster in Nepal
(A review of the Diaspora's involvement and possibilities for the future)

Suresh P. Ojha[1]

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ABSTRACT

Nepal has a fragile telecommunication system. Following the expected 8.0 Richter scale earthquake in Kathmandu, Nepal's existing communication system will either be destroyed or severely overwhelmed. Operational communication systems following a massive disaster save lives. They allow hospitals to communicate with each other, allow life-saving resources to be efficiently routed, and enable first responders to respond more effectively. Disaster communications is an arena in which Nepal can be fully prepared prior to the devastating earthquake. The flexibility and scalability of communication technologies allow for the possibility of large-scale disaster communication preparedness in Nepal prior to the expected earthquake. The Nepali Diaspora has been keenly involved in advocating for and helping to develop Nepal's disaster communication infrastructure. The Diaspora has been successful in launching major initiatives in Nepal, and in exploring ways that the outside world can communicate with Nepal under a communication blackout.

This paper will review what has been accomplished, Status of existing initiatives, and future disaster communications possibilities with a special focus on the role of Nepal's Diaspora.

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Dynamic Response of a Simply Supported Bridge under a Moving Vehicle Using MATLAB/Simulink

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ABSTRACT

Bridges are one of the most important class of infrastructures worldwide. They play a vital role in transportation systems. The vibrations due to the moving vehicles can cause fatigue and greatly influence the service life of a bridge. Therefore, this factor is one of the most important to consider in the design of bridges. Thus, the study of the bridge response considering the interaction between the moving vehicles and the bridge structures has attracted much attention. Various analytical and numerical/computational techniques have been used to solve the dynamics equations of motion to obtain the bridge response. However, fast, efficient, reliable and economical analysis methodologies for bridges are necessary for real time health monitoring and condition assessment of bridges.

The objective of the present study was to determine the dynamic response (mainly, time variation of the mid-span deflection) of a single span, simply supported bridge under several cases of moving loads using MATLAB/Simulink and to compare the results thus obtained with other methods. Simulink provides a graphical editor, customizable block diagram environment, and solvers for multi domain simulation and Model-Based Design for modeling and simulating dynamic systems. It is integrated with MATLAB and hence provide access to all the capabilities of MATLAB algorithms.

In the present investigation, the bridge span was idealized as a simply supported beam. Three cases of loading were studied: (1) moving constant force, (2) moving (rolling) mass, and (3) moving vehicle. In all 3 cases, the load/vehicle was considered moving with constant velocity over the bridge. For Case 1, contribution from the first 3 modes of vibrations and for Cases 2 and 3 only the contribution from the first mode of vibrations on the mid-span deflection were considered. Damping was ignored in the first two cases, but was included in the last case. The coupled time and distance dependent equations of motion were decoupled into two, one only with distance dependent and the other only with time dependent using the mode superposition technique.

For Cases 1 and 2, influence of two different magnitudes (55 km/h or 31 mph and 66 km/h or 34 mph) of velocity of the constant moving force (Case 1) or constant rolling mass (Case 2) on the dynamic response of the bridge structure (beam) were studied. The response was obtained solving the resulting linear equation of motion in Case 1 and the non-linear equation in Case 2. The mid-span deflection at any time for different velocities of the force or mass were obtained and compared with previous studies. The responses for Case 2 also included mid-span acceleration with time.

Finally, for Case 3, the dynamic response of the bridge due to a vehicle moving across the span was investigated. The vehicle was modeled with combination of unsprung rolling mass and sprung mass-spring-damper system. In this case two coupled equations of motion were developed representing the vehicle and bridge, respectively. These equations are coupled at the contacting points between vehicle and bridge. Also the contact points between vehicle and bridge are time and distance dependent because of moving vehicles. To solve the coupled equation, an iteration procedure is used. The mid-span deflection and acceleration results were determined using the MATLAB/Simulink and were compared with other studies. The results from current study compared well with the previous studies.

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Extracellular Matrix (ECM) in Our Tissue Structure

Bikram Sharma, Ph.D.[1]
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ABSTRACT

Extracellular matrix (ECM) constitutes a large component of our tissue structure. Primarily, ECM provides structural and adhesive support to our cells, but it also controls cellular signaling and behavior. Homeostasis of extracellular matrix composition and function is maintained by our body through a balanced synthesis, degradation and remodeling of ECM. However, under pathological conditions and genetic mutations, ECM homeostasis is disrupted due to deregulation in ECM synthesis, assembly, remodeling, and degradation. A number of diseases, including cardiovascular diseases and cancer, are found to occur due to alterations in ECM. Therefore, targeting ECM can be an attractive therapeutic approach to treat these diseases, and it requires our complete understanding of the ECM molecules and the molecular mechanism it employs in controlling cellular functions.

To this end, this study is aimed at the characterization of two ECM proteins—Matrix Gla Protein (MGP) and Lumican—for their roles in vascular development, angiogenesis, and cancer. Findings from this study show that MGP is a critical ECM regulator that promotes angiogenic resolution by suppressing endothelial sprouting and stabilizing vascular lumen formation.

In addition, MGP also inhibits tumor growth by inhibiting tumor angiogenesis. On the other hand, our findings show Lumican suppresses tumor growth and has anti-angiogenic activity in a context specific manner.

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Tele-Medicine in Nepal

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ABSTRACT

Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance. It has been a widely popular topic in the medical field around the world, especially for the undeveloped countries.. There is enormous potential of making a big difference in health care system in Nepal by the use of telemedicine technology. A successful pilot project has already been started in a village in Nepal. This paper entails the concept of telemedicine, its scope; and the challenges that lie ahead.

The Telemedicine project in Nepal is headed by Mr. Muni Shakya, the first computer engineer of Nepal. The engineering team is also headed by Mr. Shakya, and the medical team consists of the freshly graduated medical doctors from Tribhuvan University Teaching Hospital (TUTH). The engineering team has built necessary technical equipment including computers at a very low cost. The medical team, mostly based in Kathmandu through the help of engineering team connects with the patients in the rural parts of the country. In the rural sites, auxiliary health-care workers facilitate the communication between the patients there and the doctors in Kathmandu. Such auxiliary health workers are trained in Kathmandu for 2 weeks prior to starting Tele-medicine. The current connection is made through CDMA enabled telephone over the internet. Currently, the tele-clinic has been running once every Saturday from Kathmandu. This pilot project has been very successful, and the plan is to launch similar clinics in other villages of remote districts of Jumla and Dhading. This model of such tele-clinics has been self-sustainable as the cost to run such clinics is very low.

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Single Domain Antibody in Diagnosis and Therapy of Cancer and Infectious Disease

Toya Nath Baral, Ph.D.[1]

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ABSTRACT

More than thirty antibodies have been approved as therapeutics against different disease conditions which includes autoimmune disorders, solid and hematological cancers, and infectious diseases. There are approximately 360 antibodies currently in clinical studies, with 30 in pivotal trials. Antibody based therapy of cancer has been established as a first line of treatment for several type of cancer.

Antibodies have two distinct functions; bind to its antigen and interact with the receptors on different cells. Minimizing the size of antigen-binding proteins to a single immunoglobulin domain with high affinity to a target antigen has been one of the major goals of antibody engineering.

In thi presentation, we discuss the smallest fragment of antibodies, single domain antibody, from their possible application in diagnosis and therapy of cancer and infectious disease.

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Indoor PM2.5 in Household Kitchens of Bhaktapur, Nepal, Monitored with an Inexpensive Light-Scattering Monitor

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ABSTRACT

This study presents data on sources of PM2.5 in 824 households belonging to the participants of case-control study investigating the association between household air pollution and acute lower respiratory infection (ALRI) in children ≤ 3 years in Bhaktapur municipality, Nepal.

The study took place in lab and two household air pollution measurement phases. The first phase involved: validation of the light scattering nephelometer -- UCB particle monitor (UCB-PATS) against the gold standard--gravimetric pump and filter method (n=60); estimation of field based particle coefficient (PCs) for main fuels used in the study site; and gravimetric measurements of PM2.5 levels in the bedroom (n=9) and ambient air (n=8). The second phase involved measurements of PM2.5 concentrations in the kitchens of participants of epidemiological study by UCB-PATS using field derived PCs.

The validation of UCBs against the gravimetric method to measure PM2.5 showed good correlations (coefficient of determination R2=0.84). UCB-PATS performed well in the field. Results obtained from UCB-PATS provide confidence that it has a significant potential for use in the large scale monitoring of household air pollution in developing countries.

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Dayitwa, Nepal Public Service Fellowship

Pradeep Khanal[1]
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ABSTRACT

Nepal has an immense potential for economic growth and development. One of the greatest opportunities for our country is the aspirations of our passionate Nepali youths to contribute to the development of New Nepal. It is the dayitwa, or duty, of our generation to spearhead the process of Nepal's transformation by leveraging our technical expertise, vast international and domestic academic and professional networks, and our knowledge of and love for our motherland. The Dayitwa's mission is to initiate and facilitate this process of national transformation.

The dream is to instill a 'culture of collaboration' for nation building through the process of 'brain circulation,' and to facilitate the creation of a passionate and talented cadre of masons who will develop a good understanding of the workings and needs of Nepal's public sector and embrace the dayitwa of strengthening it to better serve the people, and of leading New Nepal's transformation.

The Dayitwa will build a collaborative platform, where students and young professionals (based in both Nepal and abroad) will work closely to generate specific deliverables for public sector institutions, under the supportive mentorship of experts and academicians from reputed universities and firms based both nationally and internationally. While the ideas will be generated by the teams and based on the needs of partner institutions, the projects may fall under the following categories: specific action-oriented policy research, innovative technology projects, scaling-up replicable models of economic and social development.

The Dayitwa team will work closely with Partner Agencies, Fellows from Diaspora and Nepal, and Technical Advisers to facilitate project design, build and orient a fellowship team, and implement of project activities to produce meaningful deliverables.

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Design and Development of Mobile Devices in Nepal: Scope and Possibilities

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ABSTRACT

With increase in low-cost electronics, Open Source software and overgrowing OEM, there lies numerous possibilities of designing, prototyping and demonstrating the proof of concept with a very small cost. Like never before, not only people in developed country like USA, UK or Australia can afford them, but also someone from developing countries like Nepal can afford them with a small amount of money. The investment is less. The risk is low. And if successful, the ROI is huge.

Further, today's market is not limited to the boundaries of one country but is beyond this globe. With internet, social-media, and individual targeted advertisement, approaching people, selling your products and selling your ideas have become much simpler than before. Therefore, in this world of simplicity and accessibility, where do we lie in the design and development of such products? What will it take to design and develop mobile devices like smart phones, tablets, and other electronic gadgets? What is the scope of such development in Nepal? Do we have such manpower? Will people trust us? Will they buy the product? Where do we get the money needed for production?

In this presentation, we try to look at the possibilities and scope of design and development of such mobile electronic products in Nepal.

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Electric Vehicles from old Petrol/Gas Engine Conversions in Nepal

Achyut Shrestha[1]
Phoenix, AZ

ABSTRACT

Electric Vehicles are the locomotive driven with the power of Electricity. Battery is the main source of Electric Vehicle. The technology of battery to store electric power is developing gradually and most of the battery is manufactured in China and India, our close neighbors. Charging of this battery can be done with the hydro electricity generated in Nepal. Even during the winter, load shedding time electricity is available for least 5-8 hours in 24 hr. As Nepal generates more hydroelectricity in coming days, EV Enthusiast in Nepal can start sharing the know-how and be prepared.

The old petrol/diesel vehicles' engines in Nepal are slowly getting less efficient and also difficult and expensive to make them pass the Smoke Emission Test. The duty tariff on new vehicles to import is around 238%. Nepal has resourceful electric motors Technicians and skilled welders in every city. In average most of private vehicles within city are driven around driven 50-100 km. The average speed of vehicles driven in city is around 45 km/hr.

These reasons are the perfect best match in Nepal for what the basic Electric Vehicles technology can offer and this technology is readily available and is affordable. These are the very good reasons as an initiative to convert old Petrol/Diesel engines in Nepal into Electric Vehicles. As high end technology of EV and economy of the EV Drivers improves, we can also scale on the conversion with the high end technology.

The Electric Vehicles conversion future of Nepal looks bright and promising. Nepal government is already giving initiative to import EV components in discounted duty. Safa Tempo, which started in Kathmandu, Nepal with 7 Vikram tempo conversion in 1993 is one very good example, that Nepal is already ahead in the game of Electric Vehicle conversion.

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'Together we CAN Develop'

Networking Mixer Presentations

Presentation I

Title of Presentation:

Looma: VTS' volunteers are developing Looma: an interactive computer system that will bring internet-scale knowledge, inspiration, and new dynamics to classrooms worldwide. Looma's large projected image, good sound and simple user interface delivers videos, photos, pre-loaded government textbooks, a whiteboard and interactive games using less than 100 watts. www.villagetechsolutions.org.

Speakers:

David Sowerwine: VTS Founder & President. David Sowerwine is a long-term social entrepreneur. He and his wife Haydi lived in Nepal, implementing village improvement technologies for 14 years. David graduated with an M.B.A. and a B.S. in Chemical Engineering from Stanford. David's desire to be involved in innovation and economic development led to an international career with Esso, Castle & Cooke, Raychem, and Chemonics.

Skip Stritter: VTS Technology Director & Chairman of the Board. Skip Stritter is a long-term Silicon Valley entrepreneur and investor. Skip graduated from Dartmouth College and received his Computer Science PhD from Stanford. He worked as a microprocessor designer and executive at Motorola, MIPS, Silicon Graphics, Clarity Wireless and Cisco. In addition, Skip has mentored and served on the board of about 25 Silicon Valley startups.

Presentation II

Title of Presentation:

Center for Information Technology, Nepal: CIT is effectively using technologies in Nepal to solve the problem of digital divide in impoverish country. By innovatively working together with many NGOs and INGO it conducts technological based surveys, technical trainings, establishes telecenters, software development in remote parts of Nepal. www.citnepal.org.

Speaker:

Bimal Sharma: President, CIT and Professor of History at Tribhuvan University, Kathmandu Nepal. He is the Founding President of Computer Association of Nepal, established in 1992, and is considered connector among the ICT professionals in Nepal. He has published many articles advocating ICT development in Nepal.