

The symposium on 'Energy' chaired by S. Sivaram (National Chemical Laboratory, Pune) commenced with a talk on 'Silicon-based photovoltaic technologies' by G. Rajeswaran (Moser Baer Photovoltaic Ltd, New Delhi). He highlighted the advances in crystalline and hydrogenated amorphous silicon photovoltaic technologies that have been incorporated into recent commercial production lines and the technology opportunities that can be further tapped.

R. Rajaraman (JNU, New Delhi) presented an overview of the present status and future prospects of nuclear energy at both national and international levels. A talk on the engagement of CSMCRI in the engagement of energy from bio-resources was delivered by P. K. Ghose

(CSMCRI, Bhavnagar). He discussed the importance of jatropha and seaweeds as an important source of biofuel.

The third day of the meeting opened with a special lecture on 'Mammalian prolactin – an ancient but still a mysterious hormone' by K. Muralidhar (University of Delhi). He discussed the role of prolactin in some of the interesting physiological and behaviour processes in all vertebrates.

S. K. Apte (BARC, Mumbai) presented a talk on 'Living dangerously: the *Deinococcus* way'. *Deinococcus* is an extremophile capable of surviving high doses of UV and IR and it has been engineered for bioremediation of mercury and toluene from nuclear wastes. *Deinococcus* offers an exciting opportunity for

basic research and for the development of biotechnologies related to nuclear energy.

The next presentation was on genomic and proteomic approaches in cancer classification and treatment by K. Somasundaram (IISc). He presented data related to gene signatures which could identify specific grades of glioma, subgroups of patients with better response to treatment and potential therapeutic targets.

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MEETING REPORT

Emerging directions in global education*

Emerging Directions in Global Education (EDGE, www.edgeforum.in) is an initiative to bring together educational leaders, practitioners, decision makers from the public and private sectors, and thought leaders from India and across the globe to create a virtual roadmap for the Indian higher education sector. The second edition of EDGE was organized recently. The conference attracted over 250 delegates who represented the decision-makers of some of the leading higher educational institutions in the country, as well as international participants from the United States, the European Union, Australia, Singapore and other countries.

The first conference, held between the 3 and 5 March 2008 marked the beginning with the release of the 'India Education Vision Document' that traced the broad vision outlining the aims and the broad contours of higher education in India. The document reflected the ideas, goals and missions, priorities, hopes and aspirations for Indian higher education.

EDGE 2009 placed the deliberations of the conference within the context of

transformation of higher education for global opportunities. In his inaugural address, K. Kasturirangan (Chairperson, Vision Group, EDGE and Director, NIAS, Bangalore) stated that, as globalization pervades all facets of our life, managing change is the need of the hour, as educational institutions transform to keep pace with the global forces of change.

In keeping with this agenda, the theme of EDGE 2009 was – Transforming Educational Institutions for Global Opportunities – Directions for Higher Education. The conference, inaugurated by Sheila Dikshit (Chief Minister, Delhi), had various interesting sessions, workshops and exhibitions. In addition, two new components were added this year, the Young EDGE award and a segment on research in higher education.

The incisive comments as well as the encouraging remarks from both Sheila Dikshit and Montek Singh Ahluwalia (Chairman, Planning Commission), set the tone for the conference, pointing out 'Can't we just get going?', and the importance of not being caught with work done in the past and looking forward to what could be done in the future. Montek Singh Ahluwalia was the recipient of the EDGE-Education Personality of the Year Award 2009, for his indispensable role as

Chairman of the Planning Commission and his contribution to the higher education sector in that capacity. The Young EDGE Award, marking the efforts of a person in the field of higher education below the age of 45 years, was given to Vidya Yeravdekar, Symbiosis University, Pune for her contributions, especially towards internationalization of higher education.

Three pre-conference workshops were organized this year: (i) Building Partnerships between the US and Indian Institutions of Higher Education (USIEF), (ii) Leadership and Progressive Governance for Educational Institutions (Indian School of Business, Hyderabad), (iii) Academic Counseling for Career Planning (The College Board, USA).

In the plenary session, Tan Chorh Chuan (President, National University of Singapore (NUS)), spoke about shaping universities that help shape global education. He pointed out that universities which aspire to stand out globally need to not only cope with the challenges posed by change, but also shape the future. One of the key drivers of change in the present scenario is globalization or 'shrinking globe', leading to a higher interconnectedness between institutions.

Chuan's description of the journey of NUS from a state-run university to a

*A report on the second in the series of conferences on 'Emerging Directions in Global Education' organized between the 9 and 11 February 2009 at the India Habitat Centre, New Delhi.

registered company in a span of 20 years was illuminating and illustrative of internationalization and innovative global education programmes adopted in the change process. He laid emphasis on the advantages of innovative initiatives and beneficial academic outsourcing. Universities may look beyond themselves to other institutions that may have complementary strengths, for collaborations. This can be facilitated by affiliations to international university alliances and networks. In the new paradigm, research and its application also play an important role for creating an impact on the university. Institutions should aspire to provide thought leadership in key areas.

In this backdrop, Goverdhan Mehta (Chairperson, NAAC) speaking on 'The 21st century – a future imagined', traced the present scenario of the Indian higher education sector and the road ahead. He pointed out that India can capitalize on its strong human resource. The 11th five-year plan targets on increasing the GER from 9–10% to 15%. Hence, the number of students in the higher education sector in India will increase from ~11 million to about 20 million. Keeping the same student: faculty ratio will require 0.5 million additional faculty members. The session on 'Leveraging new technologies: transforming education' focused on emerging and path-breaking technologies to enable the education sector to have tremendous reach ensuring accessibility and equity and providing excellent, contemporary and quality education. Smart and sensible use of new technology can act as a powerful tool for transformation. In the session on 'Study abroad programme: harnessing opportunities for Indian educational institutions', the discussions centred around ways of attracting international students to Indian campuses and delivering high-quality experience. The 'Innovative models for funding higher education' session drew financial experts who focused on how to overcome two significant hurdles in the field of higher education: (a) Financing the higher education of students using new methods and assessment techniques for eligibility. (b) Financing educational institutions to equip themselves with state-of-the-art infrastructure to realize their growth plans.

The session on 'Technology: a paradigm shift in managing institutions' focused on transforming campuses into automated efficient environments. The benefits for administrators, faculty, par-

ents and students are immense. Skills are key for a globalized world. Linking education to employability in innovative ways can create opportunities for the institutions. Experts addressing the session on 'Vocational education – the next revolution' focused collaboration with industry and international experts to tap this huge potential.

Following the recent report by *Times* magazine, on the top 200 global institutions with very poor representation from India, an interesting panel discussion on 'What's stopping us from breaking into the top league of global institutions' was organized, where leaders of leading educational institutions in India presented an honest appraisal and focused on actions that ought to be taken by institutions collectively and individually to belong to the top league. Hence, 'what is stopping us' was translated into 'what is required'.

The segment on the research reports was the highlight of this conference (details of the reports available at www.edgeforum.in/indianhighereducation.html). The four reports were as follows.

NIAS–EDGE 2009 Document discussed the challenges faced by Indian higher education in the process of transformation. The document raises critical doubts juxtaposing the international context with Indian realities. Evolving strategies against this background is pertinent and crucial for India.

The Ernst and Young EDGE report studied the private sector, a key constituent of higher education in India. It presents some of the enterprises operating in India and highlights matters such as regulatory environment, streamlining operations and financing models.

The ICFAI-MARCH report examined the omnipresent problem of recruitment and retention of faculty. Strategies adopted by various institutions in India and abroad were presented.

The IIE India-centric report looked at emerging trends of internationalization of Indian higher education.

The final panel discussion on 'Collaborative initiatives in research and higher education' chaired by Kasturirangan had leaders of India's leading research institutions, education, and international education missions talking about how innovative collaborative approach make research a strong component in higher education, elucidating successful case studies.

Several recommendations were generated during the deliberations of the conference. For example, to stay relevant, universities need to provide transformative education by adopting three shifts. (i) Shifting from preparing graduates for a career of life to preparing them for a lifetime of careers. Universities need to move from narrow specialization to a more broad-based training, keeping the focus on the chosen area, but with sufficient familiarity in different subjects, enabling graduates to work across disciplines. (ii) Striking a balance between training the mind and shaping the whole person through a balance of formal classroom learning and experiential learning. (iii) Importantly, universities must shift from educating for local settings to educating for global settings, so that the learning is effective in diverse cultural settings.

Important factors that position universities to take on the new role of shaping change include autonomy to set their own directions with focus on quality and excellence and maintaining a global outlook.

Indian higher education is characterized by its robustness and resilience; insufficient financial support but a commendable management with the present resources; disconnect with the job market; aging infrastructure and faculty; lack of quality consciousness and absence of competitive regime, especially between public, private and international institutes. Also, education in India is under the concurrent list. There are structural problems, including issues of pedagogy, governance, autonomy and accountability. These problems need to be addressed. The conference pointed at some enablers for solving these issues – rewiring of our minds; creating a roadmap and being strategic rather than opportunistic; focusing on reconstructing, rejuvenating and reinventing; doing away with departmental structures; focusing on quality as the key to attracting students; re-engineering the undergraduate programme; creating a new model for public–private partnership and analysing and making an informed judgement over the nature of engagement with other global institutions.

Research and collaboration emerged as yet another important direction in the road to excellence. There is a need to move beyond decade-old examples like the CLRI, to newer and better initiatives in collaboration that can yield quick,

positive results. Private universities need to significantly increase their contribution to research through collaboration with research organizations. Initiatives must be made from both ends.

To break into the league of world-class universities, one needs to redefine universities, where disciplinary boundaries are transcended across knowledge domains of science, social sciences and humanities. The doctoral and postdoctoral programmes need to be strengthened. It was pointed out that 500–600 PhDs can be trained as postdoctoral stu-

dents abroad at our own expense by taking the brick-and-mortar expense of two universities. Provision of untied, independent grants and creating opportunities for faculty and students to interact and collaborate with the best of the world on an equal footing will be some of the steps in the right direction.

The conference served as a successful platform to set new directions for the growth and transformation of the higher education in India. Indian universities have the potential, but responding to and more appropriately shaping change is the

essence if India has to stake claim to be among the top-ranking universities of the world.

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MEETING REPORT

Coal and organic petrology*

The International Conference on Coal and Organic Petrology was the first joint meeting of the International Committee for Coal and Organic Petrology (ICCP) and The Society for Organic Petrology (TSOP) (60th of ICCP and 25th of TSOP) held in Europe, featuring the following topics: General coal and organic petrology; Geological applications of coal and organic petrology, and Industrial applications of coal petrology.

Studies under the topics were covered in the ICCP accreditation programmes on three successive days and TSOP technical sessions in the following two days. More than 130 scientists from varied disciplines in coal science representing 28 countries, participated in the conference.

The conference started with a council meeting on the first day. On 22 September, Isabel Suarez-Ruiz (Chair of the Organizing Committee) welcomed the CSIC Vice-President, Rosa Menendez Lopez and all the delegates which was

followed by an opening address by Lopez and keynote lecture by the General Director for Research and New Developments of HUNOSA (an international coal brand in UK) on 'Asturian coal basins: from traditional mining to new uses'. The first plenary session of the ICCP General Assembly was chaired by Petra David (President and General Secretary, ICCP). A report on 'Environmental applications of organic petrology' under 'Organic petrology and geochemistry in environmental technology' was presented by Hamed Sanei (Convener of ICCP Commission II). Reports of ICCP Commissions I–III respectively, were presented by Walter Pickel (Australia), M. A. Gomez Borrego (Spain) and Isabel Suarez-Ruiz (Spain). The important research findings carried out by different Working Groups on varied aspects of coal and its constituents, dispersed organic matter, CO₂ sequestration, coal blends, etc. were presented by ICCP member scientists. New Working Groups according to the need of research, proposed by scientists under the ICCP accreditation programmes were accepted. The ICCP meeting ended with the closing plenary session of the General Assembly on 24 September, including ICCP awards ceremony. The Organic Petrology Award for 2008 was given to Borrego for her outstanding contributions and excellent work in the field of organic petrology and also for extensive involvement in ICCP activities. The venues for forth-

coming meetings were decided and information on the next ICCP Annual Meeting to be held at Porto Alegre in 2009 was highlighted by Wolfgang Kalkreuth (Brazil). A microscope session was also organized to observe and discuss the coal and peat petrographic constituents and related aspects.

A scientific ICCP–TSOP joint session on 'Organic petrology in the context of global climate change and greenhouse gases emission' chaired by Borrego started on 25 September. T. Gentzis (USA) delivered a talk on 'CO₂ storage capacity in coals', on the results obtained about combined investigations on coals from USA, Canada and Australia. The session was opened by Leslie Ruppert (President, TSOP). The morning and afternoon technical sessions were organized under the following heads: (i) Coal as gas reservoir and (ii) Organic petrology applied to coal utilization and coal by-products on 25 September, and (iii) Advances in organic petrology and organic geochemistry and (iv) Organic petrology applied to climate and environmental studies on 26 September.

The results of investigations on various coal researches were presented as 28 oral presentations and 49 poster displays. Significant contributions were made on coal, lignite, coke and source-rock characterizations with respect to their genesis, deposition, mineralogy, maturation, technological utilization, sorption behaviour for methane and CO₂, reservoir characteris-

*A report on the 'International Conference on Coal and Organic Petrology', a joint International Committee for Coal and Organic Petrology and The Society for Organic Petrology meeting held at Oviedo, Spain during 21–27 September 2008 and sponsored by INCAR (Instituto Nacional del Carbon) of the Spanish Research Council (CSIC), FICYT (Fundacion para el Fomento en Asturias de la Investigacion Cientifica Aplicada y la Tecnologia), Nalon Chem., and HUNOSA (Chem Labor.).