

Conference Call

Polymer Gels and Networks

by Miroslava Duskova and Michal Ilavsky

Polymer Gels and Networks was the 44th Microsymposium in the series of Prague Meetings on Macromolecules. The conference, organized by the Institute of Macromolecular Chemistry of the Academy of Sciences of the Czech Republic, took place in Prague from 10–14 July 2005—a fitting tribute to the 75th birthday of Prof. Karel Dusek. The event was sponsored by IUPAC, the Polymer Networks Group, and NANOFUN-POLY, the European Network of Excellence.

The conference, which attracted 188 scientists from 32 countries, featured 43 lectures over four days and 112 posters presented during two evening poster sessions. During the opening session, Prof. R.F.T. Stepto (UMIST, Manchester, UK), president of the IUPAC Polymer Division, introduced IUPAC aims and gave a very good overview of activities of the Polymer Division. The presentations covered a wide range of topics pertaining to synthetic and natural gels, and to crosslinked polymers addressed from the point of view of synthesis, structure, properties, applications, and modeling. Special attention was focused on the application of hydrogels in medicine. From the early history of poly(N-isopropylacrylamide) (PNiPAAm), to how Karel Dusek and others influenced the scientific community, to more recent work, all the lectures were engaging. The closing lecture, “Fifty Years with Polymer Gels and Networks and Beyond,” presented by Karel Dusek, was joyfully applauded by the audience.

IUPAC Poster Prizes were awarded at both evening poster sessions. The best posters were selected by an international committee chaired by Prof. Henryk

Galina from Rzesow Technical University in Poland. The poster prizes went to T. Gotoh from the Department of Chemical Engineering of Hiroshima University, Japan, and to Irena Kroutilova of the Prague Institute of Macromolecular Chemistry of the Academy of Sciences.

Some of the lectures and posters will appear in a special issue of *Polymer Bulletin*. Dr. Petr Stepanek of the Institute of Macromolecular Chemistry in Prague is organizing the 45th Microsymposium on “Structure and Dynamics of Self-Organized Macromolecular Systems,” which will be held 9–13 July 2006.

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Ionic Polymerization

by S. Sivaram

The biennial **IUPAC Symposium on Ionic Polymerization** was held 23–28 October 2005 in Goa, India—the first time this specialized symposium was held in India. The conference provided an opportunity for the Indian scientific community to interact with leading scientists from around the world working in the area of ionic polymerization. A total of about 150 participants from USA, France, Germany, Poland, United Kingdom, Japan, South Korea, and India attended the symposium, which took place at The Leela, a resort hotel near Colva Beach in Southern Goa.

Dr. S. Sivaram, director of the National Chemical Laboratory in Pune, India, gave a brief welcome

Participants at the 68th Microsymposium on Polymer Gels and Networks 2005.





Dr. Sivarim (left), Prof. J.P. Kennedy, and Prof. Kubisa during the inaugural session of IP 2005, Goa, India.

address on the first day of the symposium. IUPAC representative, Prof. Kubisa gave an introduction to IUPAC and discussed the activities of the polymer division. Prof. J.P. Kennedy gave brief opening remarks, highlighting the evolution of the field of ionic polymerization and its present relevance.

The elegance of ionic polymerizations is the ability to synthesize polymers with well-defined architectures without any side reactions such as termination and transfer. The topic of atom-transfer radical polymerization which has similar attributes of ionic polymerization with respect to control of the polymerization was also included in the symposium.

The technical program, which was organized into morning and afternoon sessions, consisted of 52 oral presentations and 38 posters presentations. Each session was chaired by two eminent scientists, one from India and another from abroad. The order and sequence of presentations were carefully blended so that each session consisted of established and young practitioners in the fields of anionic, cationic, and controlled radical polymerization. Several scientists from India involved in these areas were also invited to speak at various technical sessions.

The symposium also featured well-received evening lectures, which covered topics such as the emergence and growth of the polymer industry in India and the emergence of India as an R&D hub for the global chemical and polymer industry. In order to provide maximum opportunities for interaction among participants, the symposium was held with no parallel sessions and speakers were provided with 25 minutes for their presentations.

The papers presented at the symposium will be published in a future issue of *Macromolecular Symposia*. In the meantime, a conference report has been published in *Macromol. Chem. Phys.* 2006, **207**, 637-639 (2006).

Dr. S. Sivaram <sivaram@ems.ncl.res.in>, director of the National Chemical Laboratory in Pune, India, served as the conference chairman.

European Science Education Research

by Roser Pintó

The 5th International Conference of the European Science Education Research Association (ESERA) was held in Barcelona, Spain, from 28 August to 2 September 2005. More than 500 researchers in science education from around the world, but mainly from Europe, met at this biannual event.

The conference was organized by Prof. Roser Pintó, from Universitat Autònoma de Barcelona. The executive committee of ESERA, a local organizing committee, a scientific committee, and a honor committee helped in the organization of the event.

The main topic of the conference was "Contributions of Research to Enhancing Students' Interest in Learning Science." In many western countries there has been a decrease in students' interest in learning science and choosing scientific careers, in particular in the physical sciences. The goal of the conference was to enable the science education research community to address this issue through research-based insights. At the conference, more than 400 contributions of research—organized around 20 different foci, such as teacher education, new curriculums, gender issues, environmental education, informal education, ICTs—were presented and discussed.

The conference program included six plenary sessions from internationally well-known keynote speakers; a panel session with editors of high-impact international research journals, nine parallel sessions for the presentation of research results, and a final open debate about "Where the Research in Science Education is Going On."

Other activities included social events, an ESERA general assembly and the formal opening and closing ceremonies, with the assistance of different educational and research policy authorities, representatives from the four catalan organizing universities (Universitat Autònoma de Barcelona, Universitat de Barcelona, Universitat Politècnica de Barcelona and Universitat Pompeu Fabra) and representatives from the European Commission Research Directorate. The conference was sponsored by the Educational and Research administrations of Catalonia, ESERA and IUPAC.

Prof. John Leach, from the University of Leeds (United Kingdom), discussed the potentiality of science education research in his lecture "Contested

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Territory: The Actual and Potential Impact of Research on Teaching and Learning Science on Students' Learning." Prof. Andrée Tiberghien, from the University of Lyon (France), presented research results in "Studying Science Teaching Practices in Relation to Learning." Prof. David Treagust, from Curtin University of Technology (Australia), discussed "Research-Based Innovative Units for Enhancing Student Cognitive Outcomes and Interest in Science." Prof. Ivo Cap, from the University of Zilina (Slovakia), discussed informal education in his talk. Prof. Paolo Guidoni, from the University Federico II (Italy), introduced in his talk a possible model for dealing with students' understanding. Finally, Prof. Yasmin Kafai, from the University of California (United States), discussed "Children's Apprenticeship in Learning Science by Design."

The quality of participants' presentations was ensured by a double-blind review process performed by more than 80 reviewers and organized by 20 chairpersons, experts in each of the conference subtopics. Around 10 simultaneous parallel sessions took place for each of the 9 sessions for participants. These were generally arranged around specific topics to promote significant discussion among participants.

One of the important aims of the conference was to provide opportunities for training young researchers, 150 of whom were able to attend. Conference organizers provided a reduced early registration price and provided extra panel session time to encourage young researchers' active participation. A roundtable with different editors from a variety of international research journals in the field was also organized to provide an opportunity for "face to face" interaction, with the aim of motivating and facilitating young researchers to publish their research results in high-level publications.

The next ESERA conference will be held in Malmo, Sweden, 21-26 August 2007. More information is available at www.naturfagsenteret.no/esera/conference.html.

Prof. Roser Pintó <roser.pinto@uab.es> was part of the organizing committee for ESERA and is a professor at the Universitat Autònoma de Barcelona.



www.esera2005-cresils.org

New Directions in Teaching, Learning, and Evaluating the Chemical Sciences at the Tertiary Level

by Neelakanthi E. Gunawardena

Towards Modernizing Chemical Science Education in Sri Lankan Universities was held 11-12 March 2006 in Colombo. The conference, which attracted nearly 80 percent of Sri Lankan academics in the chemical sciences, is the first step toward replacing the current knowledge-based education system with modern teaching methods.

Four experts in chemistry education were brought in under the sponsorship of IUPAC's Flying Chemists Program* and its Scientifically Emerging Regions program. The Royal Society of Chemistry, UK, and the University Grants Commission of Sri Lanka were the other two sponsors. The conference was organized by the Department of Chemistry of the University of Kelaniya in collaboration with the Chemical Sciences Section of the Sri Lanka Association for the Advancement of Science and the Sri Lankan branch of the Royal Society of Chemistry.

The conference provided timely assistance to the country's effort to upgrade undergraduate chemistry education. Currently, the quality of university graduates does not match the needs of the labor market in Sri Lanka. Further, the conference was of historical significance for no such gathering of academics in the chemical sciences has ever been held. Thus, a great enthusiasm was evident among the academics who participated in the conference.

The opening session was attended by the minister of science and technology of Sri Lanka, the vice chancellor of the University of Kelaniya, and the chairman of the University Grants Commission of Sri Lanka. In this session, Prof. Peter Atkins (University of Oxford, UK), introduced IUPAC as the body that governs and sets standards in chemistry. He also described the Flying Chemists Program and introduced the other major sponsor of the conference, the Royal Society of Chemistry, UK.

The first plenary lecture, titled "Educating a Chemist; the Challenge and the Opportunity," was

*For more information about the FCP see www.iupac.org/standing/cce/FCP.html or www.iupac.org/projects/2005/2005-030-1-050.html.

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Honoring the national anthem at the Inauguration Session (from left): Mr. Premasiri de Silva, chairman-RSC SL section; Prof. M.J.S. Wijeyaratna, vice chancellor, University of Kelaniya; Prof. Tissa Vitarana, Hon. Minister of Science & Technology; Prof. N.E. Gunawardena, conference chairperson; and Prof. P.W. Atkins, University of Oxford, UK., representing IUPAC and the RSC, UK.

delivered by Prof. Atkins. He pointed out that even though chemistry is a complex subject, underlying principles are simple and that should shine through teaching. Using several examples, he showed how concepts can be taught effectively by relating them to real-life experiences. He discussed how abstraction, mathematics, and complexity are challenges in teaching chemistry and then showed how curriculum, concepts, and graphics provide ways to overcome the challenge. While highlighting the power of mathematics in understanding chemistry, Atkins said integration of mathematics in chemistry on a need-to-know basis would be more helpful to students.

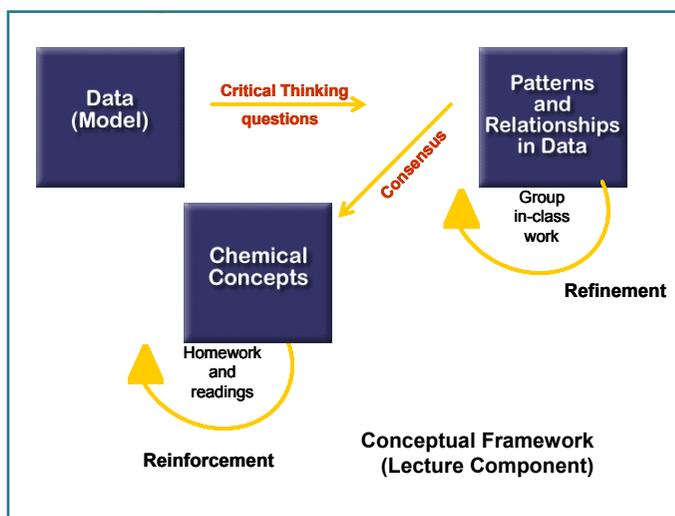
Prof. Ram Lamba (University of Puerto Rico), who delivered the second plenary lecture, titled “Why Do Students Resort to Rote Memory and Recipe Following?” said that even though the lecture model remains the preferred form of introducing new material to a class it does not automatically result in efficient learning. Quoting recent research, Prof. Lamba said that we tend to be linear thinkers, and pattern seekers. When problems break linearity, or a pattern does not fit into the known, students resort to rote-memory or reject the information. To provide meaningful learning, he said it is important to design the activities in a sequence that is compatible with the learning cycle (i.e., exploration, invention of concept, and application).

On the second day, Prof. Ingrid Montes (University of Puerto Rico) presented her lecture on “New Directions in Teaching Organic Chemistry: An Inquiry-Based Approach.” She introduced three intertwined branches in chemical education: instruction, practice, and research. For the present generation of students, Montes said, the professor should not just be a source

of knowledge. Instead, students should be involved in an active teaching-learning experience. A lecture course should incorporate active learning, technology, and interactive demonstrations, she said. Inquiry-based laboratory experiences and creative project proposals are effective tools and methods she recommended for the

development of creativity and critical thinking. Using an ethnographic study, she showed how her newly designed inquiry-based organic experiments that address different learning styles affect the teaching-learning process in the laboratory course.

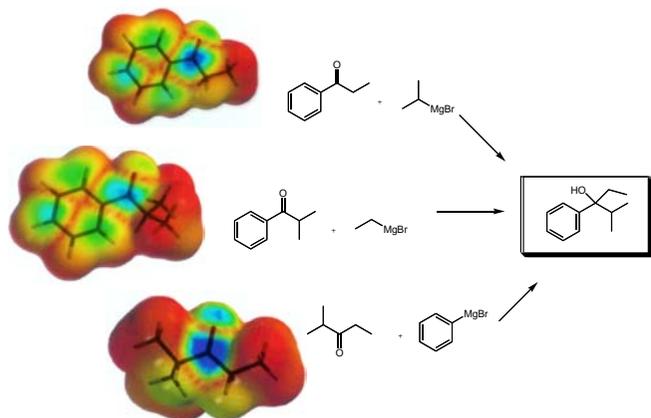
The last plenary lecture, “Introducing Environmental Chemistry and Classroom Discussion Methods into the Curriculum,” was presented by Prof. Norman Colin Baird (University of Ontario, Canada). He showed how to use environmental issues in chemistry classes to generate interest among students. Some of the examples he cited were pollution by heavy metals such as mercury, arsenic, lead, acid rain, dioxins, PCBs, PAHs, and CFCs and their replacements. Analytical applications include the determination of low concentrations of atmospheric



How can we provide meaningful learning? was a question posed by Ram Lamba during his presentation.

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Which is the most effective synthetic route?



Ingrid Montes gave examples of how to use an inquiry-based approach while teaching organic chemistry.

constituents and of pesticides and heavy metals. He showed ways to conduct interactive discussions using environmental issues to improve the learning process.

Each plenary lecture was followed by a discussion session, which was divided into four groups: organic, inorganic, physical, and miscellaneous (mostly environmental chemists and biochemists). Utilizing the material presented in the lectures, the groups focused on finding solutions to problems. Plenary lecturers in each group provided assistance with the discussions. At the concluding session, the following general conclusions were agreed upon: define a common core curriculum for the B.Sc. degree course, have a greater focus on teaching the essentials, reduce over teaching, include more technology in teaching, and include teaching of mathematics.

The conference created a high level of satisfaction among participants, especially those who came from remote universities. In response to a questionnaire, 94 percent of participants wanted to have follow-up meetings. It was a rewarding experience to the organizers too. The common bond formed within discussion groups has generated sufficient energy to initiate e-mail communication about curriculum development. The physical chemistry group is in the lead, while other groups are getting ready to do the same.

Neelakanthi E. Gunawardena <neela@kln.ac.lk> served as the conference organizer. She is a professor at the University of Kelaniya.

New Science Education Assessment: The Challenge

by Laure Joumel

The Chemical Heritage Foundation (Philadelphia, Pennsylvania, USA), which treasures the past, was focused on education for a better future during the **6th Annual Leadership Initiative in Science Education (LISE6)**, held 26–27 April 2006. The theme of the conference was “What Our Students Know: Assessment and Accountability in Science Education.”

The American educational challenge for the 21st century is to improve the teaching of science in grades K-12. The federal No Child Left Behind Act (NCLBA) of 2001 requires teachers to use research-based teaching methods and to measure student's progress regularly. That gives huge importance to assessment. Assessments are the only way for teachers to check their success. Assessment sets the rhythm of a child's life at school. Assessment is the key to teaching. So how can it best be accomplished? Teachers and administrators comprised the audience for the eight speakers at the conference, all well known personalities in their fields, who covered different angles of the topic.

Teachers in students' shoes

The conference opened with an active workshop session conducted by George DeBoer, who is deputy director for Project 2061 of the American Association for the Advancement of Science and a professor of educational studies at Colgate University. DeBoer led attendees through a two-hour practical exercise that introduced them to Project 2061. Launched in 1985, this plan helps reform K-12 education by building an online collection of assessments aligned to standards.

During the second part of DeBoer's workshop, the teachers go back to school. He used the following example to illustrate the misconceptions that children often have: What is the smallest? A: an atom, B: a bacterium (micro-organism), C: a cell in your body, or D:

Project 2061 began its work in 1985—the year Halley's Comet was last visible from earth. Children starting school now will see the return of the Comet in 2061—a reminder that today's education will shape the quality of their lives as they come of age in the 21st century amid profound scientific and technological change. <www.project2061.org>.

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the width of a hair? “We assume that they know something they don’t,” he said. The workshop provided a good opportunity for teachers to have an animated discussion.

Elisabeth Stage, director of the Lawrence Hall of Science at the University of California, Berkeley, presented a talk titled “Who Wants to Know and Why?” She pointed out the importance of the context and the motivation surrounding learning and assessment.

Discuss, Argue, and Tip

The second day focused exclusively on assessment in the science classroom. The director of the Learning and Teaching Research Center at the Educational Testing Service, Dylan William, explained how to use assessment to improve learning. “Pose, Pause, Bounce” is his motto! His best teaching tips are to make the students participate and to compensate them for good work in the classroom. “You are here to make them smarter,” he insists, and repeats, “motivation is really a necessity.” “I think we need to change the way teachers teach and not what they teach,” he said.

After learning how to perform better in the classroom, it was time to learn about tools that can make it more effective. And that’s Libby Cohen’s specialty: using technology to support Universal Design Assessment. She is the principle investigator for the Eastern Alliance in Science, Technology, Engineering, and Mathematics. She calls this generation of students the “Neomillionals” or “media multi-mavens.” “They need visual images” she pointed out, such as the one you can find on <http://vcell.ndsu.nodak.edu>, the virtual cell educational animation website. Although Libby Cohen cited some tools like video, CD ROM, and the



Internet, she insisted on the advantages of digital text: “that is malleable, transformable, and transferable” and encouraged teachers to use it.

For another angle, Amelia Maurizio, executive director of Global Educational Alliances for SAP America, described how the Partnership for 21st



Teachers in students’ shoes . . .

Century Skills works to create a better high school learning environment. She pointed out that according to a 2004 report by the American Diploma Project, “40 percent of high school graduates feel inadequately prepared for college or the workplace.” “What you measure really matters,” said Maurizio. Kathleen Comfort, principle investigator and director of the Partnership for the Assessment of Standards-Based Science at WestEd, put the teachers in children’s shoes again with an effective exercise. Comfort showed how increasing teacher understanding and use of data, coupled with instructional interventions, contribute to improved student learning and achievement in science.

Meryl Bertenthal, visiting director of research programs for the Center for Learning, Instruction, and Teacher Development at the University of Illinois at Chicago, spoke about the NCLBA and spurred discussion by asking “Should science be included in the Adequate Yearly Progress calculation?” The conference ended with a question and answer session in which the idea of a national test was debated. “Will a student from Kansas and another one from New York really need different science skills in their life?” wondered Donna Cleland, assistant director for science in Wallingford, Pennsylvania. Bertenthal had the last word, and claimed that “It’s impossible to have a national test.”

Laure Joumel <laurejoumel@gmail.com> is a freelance writer and native of France. She currently studies in the United States and will spend part of her summer at the Chemical Heritage Foundation reviewing the Ray G. Neville collection in the Othmer Library. Photos credit (including issue cover): Douglas Locker, CHF.



www.chemheritage.org/events/lise6



Keynote speaker
Elisabeth Stage.