

I U P A C

Advancing Chemistry Worldwide  
Biennial Report 2008–2009





### Goal 1

IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.



### Goal 2

IUPAC will facilitate the advancement of research in the chemical sciences through the tools that it provides for international standardization and scientific discussion.



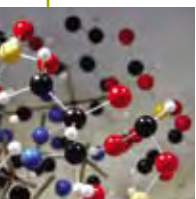
### Goal 3

IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.



### Goal 4

IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.



### Goal 5

IUPAC will utilize its global perspective and network to contribute to the enhancement of chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.



### Goal 6

IUPAC will broaden its national membership base and will seek the maximum feasible diversity in membership of IUPAC bodies in terms of geography, gender, and age.



The International Union of Pure and Applied Chemistry (IUPAC) is a non-governmental organization of member countries that encompasses more than 85% of the world's chemical sciences and industries. Formed in 1919 by chemists from industry and academia, IUPAC has succeeded in fostering worldwide communication in the chemical sciences, and in uniting academic, industrial, and public sector chemistry in a common language.

IUPAC addresses international issues in the chemical sciences and provides leadership in the validation and naming of new elements, the standardization of chemical nomenclature and terminology, analytical methods, and atomic weights and other critically evaluated data. IUPAC has been proactive in establishing a wide range of conferences and projects designed to promote and stimulate modern developments in chemistry, and to assist in aspects of chemistry education and the public appreciation of chemistry. To this end, IUPAC is actively planning for the International Year of Chemistry, designated by the United Nations for 2011.

IUPAC facilitates and encourages international agreements and the coordination of numerous activities carried out by national and regional chemistry organizations. It also contributes to the work of the International Council for Science (ICSU) in promoting science and its values in all regions of the world.

The work of IUPAC is done almost entirely by approximately 1400 volunteer scientists from many countries who serve on committees, subcommittees, and task groups. IUPAC's scientific work is conducted largely under a formal project system, in which proposals from chemists worldwide are peer-reviewed and, if meritorious, are approved and supported. [This report lists IUPAC's six long-range goals](#) and illustrates the actions taken during the last two years toward meeting those goals.

IUPAC receives its core financial support from national subscriptions paid by its National Adhering Organizations—primarily national chemical societies or national academies of science. Additional income is derived from investments of its endowment and reserve funds, from publications, and from grants for specific projects. Significant support is also received from the chemical industry, either through the Company Associates program or in the form of grants for prizes and special projects.

Nearly half of the annual budget of approximately USD 1.5 million goes to the operating expenses of IUPAC's divisions and committees, as well as commitments related to peer-reviewed projects. The funds are used primarily to cover travel costs for volunteers who comprise committees and project task groups. The other half of the annual budget is used to cover the costs of governance, communications, and a small Secretariat staff.

IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.

The United Nations 63rd General Assembly adopted a resolution on 19 December 2008 proclaiming 2011 as the International Year of Chemistry, placing UNESCO and IUPAC at the helm of the event. Ethiopia submitted the UN resolution calling for a Year of Chemistry, which will celebrate the achievements of the field and its contributions to the well-being of humanity. The Year of Chemistry is also intended to provide a fillip to the UN Decade of Education for Sustainable Development, designated as 2005–2014. National and international activities carried out during 2011 will emphasize the importance of chemistry in sustaining natural resources.

Chemistry is fundamental to our understanding of the world and the cosmos. Moreover, molecular transformations are central to the production of food, medicines, fuel, and countless manufactured and extracted products. Through the Year of Chemistry, the world will celebrate the art and science of chemistry, and its essential contributions to knowledge, to environmental protection, and to economic development.

“The International Year of Chemistry will give a global boost to chemical science in which our life and our future are grounded. We hope to increase the public appreciation and understanding of chemistry, increase young people’s interest in science, and generate enthusiasm for the creative future of chemistry,” declared Professor Jung-Il Jin, president of IUPAC.

“I welcome the opportunity to celebrate chemistry, one of the most fundamental sciences,” said Koïchiro Matsuura, director-general of UNESCO. “Raising public awareness about chemistry is all the more important in view of the challenges of sustainable development. It is certain that chemistry will play a major role in developing alternative energy sources and in feeding the world’s growing population.”



## International Year of CHEMISTRY 2011

The year 2011, which marks the 100th anniversary of the award of the Nobel Prize in chemistry to Madame Maria Skłodowska Curie, will provide an opportunity to celebrate the contribution of women to science. The Year of Chemistry also marks the 100th anniversary of the founding of the International Association of Chemical Societies (IACS), which was succeeded by IUPAC a few years later. IACS and IUPAC were established to address the need for international scientific communication and cooperation among chemists by standardizing nomenclature and terminology.

In 2007, the IUPAC Council unanimously endorsed the plan to obtain the proclamation of 2011 as the International Year of Chemistry. Less than a year later, UNESCO’s Executive Board recommended the adoption of a resolution to that effect and agreed to support all efforts leading the UN General Assembly to designate 2011 as the International Year of Chemistry.

Important global issues are addressed through IUPAC’s Committee on Chemical Research Applied to World Needs (CHEMRAWN). The CHEMRAWN series of conferences has allowed IUPAC to address issues that transcend pure science and have important socio-political aspects. Over the past quarter of a century, 15 CHEMRAWN conferences have brought together experts in science and technology,



*IUPAC President Jung-Il Jin (left) with UN Secretary General Ki-Moon Ban at UN Headquarters in January 2009*

including industrial leaders, government policy-makers, academic scientists, and members of the general public. Together they have explored, discussed, and debated how chemistry, chemical research, and chemical resources can help meet human needs or solve major problems.

Each CHEMRAWN conference focuses on an issue of global significance. Examples include food security, mitigation of greenhouse gases, sources of cleaner energy, chemistry as a tool for sustainable development, pollution prevention through the redesign of chemical processes, and adequacy of supply of pure water and sanitation. CHEMRAWN XIII, "Science, Ethics, and Development," was organized as part of the program for the 2009 IUPAC Congress in Glasgow.

The SAICM (Strategic Approach to International Chemicals Management) initiative has many themes that are highly relevant for CHEMRAWN and for the Committee on Chemistry and Industry (COCI). Both of these IUPAC bodies participated in the preparation and execution of the second session of the International Conference on Chemicals Management (ICCM2), organized by SAICM and UNEP (UN Environment Programme).

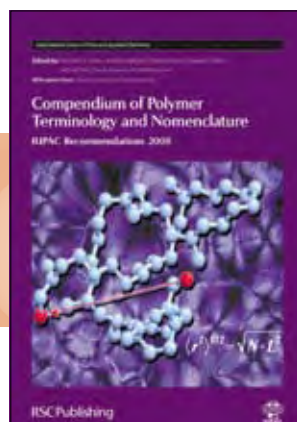
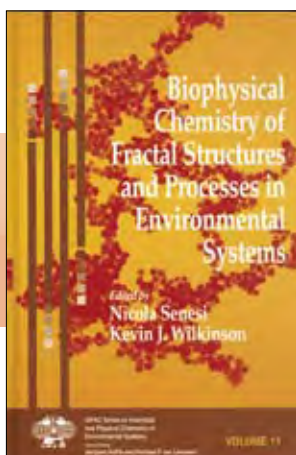
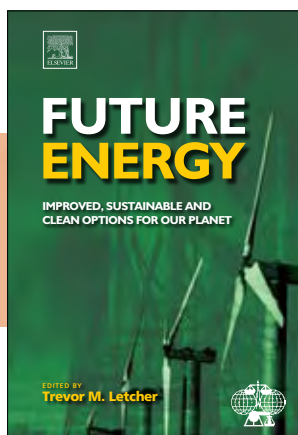
IUPAC, in collaboration with the International Union of Toxicology (IUTOX) and the Society for Environmental Toxicology and Chemistry (SETAC), presented a proposal to ICCM2 in Geneva in May 2009. This proposal was to organize and hold a science meeting on one or more emerging issues related to the sound management of chemicals worldwide, with a particular emphasis on the developing world. Ideally, the results from this meeting would be used by the delegations working with SAICM to formulate policy for chemicals management. The proposal was met with some support, but no firm decision was made. Further collaboration with SAICM is now being discussed, and an appropriate forum for such a science meeting is being considered for 2011.

Another global issue addressed by IUPAC is the development of chemistry in a cooperative way in the Middle East. In collaboration with the American Chemical Society, Royal Society of Chemistry, and Gesellschaft Deutscher Chemiker, IUPAC sponsored the fourth conference on Research and Education in the Middle East (Malta IV), held in Amman, Jordan, in December 2009, which built on earlier conferences held in Malta and in Istanbul. The conference attracted 70 participants who represented 14 Middle Eastern countries and eight countries outside the region. Six Nobel Laureates delivered plenary lectures and acted as catalysts in workshops selected by the participants: Environment, Air and Water Quality, Science Education and Green Chemistry, Alternative Energy Sources, Medicinal and Natural Products, and Nanotechnology and Materials Science.



*The Centre International de Conférences, Geneva, Switzerland, site of ICCM2, held 11–15 May 2009*





Mapping of the IFCC-IUPAC laboratory coding system to SNOMED-CT and the harmonization of terminology with the Danish IHSTDO/SNOMED-CT and the American LOINC is a major undertaking in the area of clinical chemistry and is of great significance to medical laboratory practice.

IUPAC continues to be a leader in nomenclature as well as compilation and critical evaluation of chemical data. Six books have been published during this biennium:

- *Arsenic Pollution and Remediation: An International Perspective*
- *Biophysico-Chemical Processes Involving Natural Nonliving Organic Matter in Environmental Systems*
- *Biophysical Chemistry of Fractal Structures and Processes in Environmental Systems*
- *Climate Change - Observed Impacts on Planet Earth*
- *Compendium of Polymer Terminology and Nomenclature - IUPAC Recommendations 2008*
- *Future Energy - Improved, Sustainable and Clean Options for our Planet*

Four further volumes in the Solubility Data Series were published in 2008 and 2009:

- *Transition and 12–14 Main Group Metals, Lanthanide, Actinide, and Ammonium Halates*
- *Ethers and Ketones with Water* (six-part series)
- *Rare Earth Metal Chlorides in Water and Aqueous Systems* (three-part series)
- *Esters with Water—Revised and Updated* (four-part series)

During the last two years, IUPAC projects have led to 27 Recommendations and Technical Reports published in *Pure and Applied Chemistry*. Abstracts and full-text versions of these recommendations and technical

reports are available through PAC online at no cost. A significant milestone was reached in July 2008 when a full digital archive of all PAC articles was completed. This archive, which begins with Volume 1 published in 1960, is easily accessible online at no cost. The archive provides a comprehensive published record of the Union's activities during a decisive period in its history. Anyone can now study 50 years of events, IUPAC projects, and authors with unprecedented ease.

The Committee on Chemistry Research Funding (CCRF) was recently established to improve communication among funding organizations and to help develop best practices for international research collaboration. CCRF has undertaken a unique pilot project: the IUPAC Polymer Division, in cooperation with several national funding organizations, has initiated a project to encourage and support international research collaboration in several aspects of polymer chemistry. This project builds on successful bilateral projects among the National Science Foundation (USA), Deutsche Forschungsgemeinschaft (German Research Foundation), and other organizations, but it is intended to bring together researchers from at least three countries. This project signifies an effort to identify and refine best practices in international research funding.

IUPAC sponsored 59 conferences during the biennium, ranging from the flagship IUPAC Congress (the 42nd Congress was held in Glasgow, Scotland, UK, in August 2009) and large international meetings on particular areas of chemistry to smaller symposia and workshops on specific topics. The Congress, co-sponsored and organized by the Royal Society of Chemistry, was centered on the theme of “Chemistry Solutions.” It attracted more than 2000 attendees from around the world. IUPAC concurrently held its 45th General



Assembly. Over the 10 days of the biennial General Assembly, 341 participants took part in an intense schedule of various committee and division meetings and events. Among the major events were four Round Table discussions and the World Chemistry Leadership Meeting (WCLM). The WCLM, which attracted 75 participants, focused on sharing ideas and plans for the International Year of Chemistry in 2011.

Other well-established series of conferences held during the biennium included the following:

- Agrochemicals protecting Crop, Health and Natural Environment,\* International Conference on (New Delhi, India)
- Biodiversity and Natural Products, IUPAC International Conference on (ICOB 6 & ISCNP 26) (Charlottetown, PEI, Canada)
- Biotechnology Symposium, 13th International (IBS-13) (Dalian, China)
- Carbohydrate Symposium, 24th International (ICS-24) (Oslo, Norway)
- Chemical Education: Chemistry Education in the Information & Communication Technologies Age, 20th International Conference in and ICCE Satellite Workshop\* (ICCE 20) (Pointe Aux Piments, Mauritius)
- Chemical Thermodynamics in Russia, International Conference on (RCCT 2009) (Kazan, Russia)
- Chemical Thermodynamics, 20th IUPAC Conference on (ICCT 20) (Warsaw, Poland)
- Clinical Laboratory and In Vitro Diagnostic Industry, 5th European Symposium on (Barcelona, Spain)
- Coordination Chemistry, 38th International Conference on (ICCC 38) (Jerusalem, Israel)
- Environmental Best Practices Conference, 2nd International (Krakow, Poland)
- Frontiers in Polymer Science, International Symposium on (Mainz, Germany)
- Green Chemistry, 2nd IUPAC Conference on (ICGC-2) (Moscow, Russia)
- Heteroatom Chemistry, 9th International Conference on (ICHAC-9) (Oviedo, Spain)
- Heterocyclic Chemistry, 22nd International Congress of (IHC-22) (St. John's, NL)
- Heterocyclic Conference, 9th and 10th Florida (FloHet) (Gainesville, FL, USA)
- High Temperature Materials Chemistry, 13th International Conference on (HTMC-13) (Davis, California, USA)
- Humic Substances Society, 14th Meeting of International (IHSS) (Moscow, Russia)
- Improving Chemical Education in the Philippines,\* Conference on (Manila, Philippines)
- Infrared Microscopy and Spectroscopy with Accelerator Based Sources, 5th International Workshop on (Banff, Alberta, Canada)
- Interactions of Soil Minerals with Organic Components and Microorganisms,\* International Symposium of (ISMOM 2008) (Pucon, Chile)
- Ionic Polymerization, 19th International Symposium on (IP 09) (Krakow, Poland)
- IUPAC Congress, 42nd (Glasgow, United Kingdom)
- Latin American Chemistry Congress, XXVIII (FLAQ 2008) (San Juan, Puerto Rico)
- Macro- and Supramolecular Architectures and Materials (MAM-08): Synthesis, Properties, and Applications, 4th International Symposium on (Düsseldorf, Germany)
- MacroMolecular Complexes, 13th IUPAC International Symposium on (MMC-13) (Termas de Chillán, Chile)
- Macromolecules & Materials, 10th UNESCO-IUPAC Conference on (Kruger National Park, South Africa)
- Materials of the Future—Science of Today: Radical Polymerization – the next stage (Melbourne, Australia)
- Molecular Environmental Soil Science at



**2009 CONFERENCES**  
Sponsored by the INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Month	Conference Title	Location	Dates
January	Materials of the Future, 10th International Conference on Solid State Chemistry	Prague, Czech Republic	11-15 Jan 2009
February	High Temperature Materials, 13th International Conference on High Temperature Materials Chemistry	Bratislava, Slovakia	23-27 Feb 2009
March	Polymers and Advanced Materials, 10th International Conference on Frontiers of	Santiago, Chile	16-20 Mar 2009
April	Polymers and Organic Chemistry, 13th International Conference on	Montréal, Canada	10-14 Apr 2009
May	Polymers for Advanced Materials, 10th International Conference on	Jerusalem, Israel	15-19 May 2009
June	Self-Healing Materials, 2nd International Conference on	Chicago, United States	22-26 Jun 2009
July	Solid State Chemistry, 8th Conference on	Bratislava, Slovakia	23-27 Jul 2009
August	Solubility Phenomena and Related Equilibrium Processes, 13th International Symposium on	Dublin, Ireland	10-14 Aug 2009
September	Solution Chemistry, 31st International Conference on	Innsbruck, Austria	14-18 Sep 2009
October	Trace Elements in Food, 3rd International Symposium on	Rome, Italy	22-26 Oct 2009
November	Vacuum Microbalance and Thermoanalytical Techniques, 32nd International Conference on	Lublin, Poland	15-19 Nov 2009
December	Vanadium, 6th International Symposium on	Lisbon, Portugal	14-18 Dec 2009

the Interfaces at the Earth's Critical Zone,\* International Symposium of (Hangzhou, China)

- Molecular Order and Mobility in Polymer Systems,\* 6th International Symposium (St. Petersburg, Russia)
- New Frontiers in Molecular Science: From Macromolecular Concepts of Living Matter to Polymers for a Better Quality of Life, International Conference on (PMM-73) (Prague, Czech Republic)
- Novel Aromatic Compounds, 13th International Symposium on (ISNA-13) (Luxembourg)
- Novel Materials and their Synthesis, 4th and 5th International Symposium on (NMS-IV and V) (Zhenjiang, China)
- Organic Synthesis, 17th International Conference on (ICOS-17) (Daejeon, Korea)
- Organometallic Chemistry Directed Toward Organic Synthesis, 15th IUPAC International Symposium on (OMCOS-15) (Glasgow, United Kingdom)
- Photochemistry, XXII Ind IUPAC Symposium on (Göteborg, Sweden)
- Photodynamics, 5th International Meeting on (Havana, Cuba)
- Physical Organic Chemistry, International Conference on (ICPOC-19) (Santiago de Compostela, Spain)
- Plasma Chemistry, 19th International Symposium on (ISPC-19) (Bochum, Germany)
- POLYCHAR 16 - World Forum on Advanced Materials\* (Lucknow, India)
- POLYCHAR 17 - World Forum on Advanced Materials (Rouen, France)
- Polymer Colloids: from Design to Biomedical and Industrial Applications, Conference on (Prague, Czech Republic)
- Polymer Congress, European (EPF '09) (Graz, Austria)
- Polymer Congress, World, 42nd International Symposium on Macromolecules (MACRO 2008) (Taipei, Taiwan)

- Polymers and Advanced Materials,\* 10th International Conference on Frontiers of (Santiago, Chile)
- Polymers and Organic Chemistry, 13th International Conference on (POC '09) (Montréal, Canada)
- Polymers for Advanced Materials (Jerusalem, Israel)
- Self-Healing Materials, 2nd International Conference on (Chicago, United States)
- Solid State Chemistry, 8th Conference on (SSC 2008) (Bratislava, Slovakia)
- Solubility Phenomena and Related Equilibrium Processes, 13th International Symposium on (ISSP 13) (Dublin, Ireland)
- Solution Chemistry, 31st International Conference on (ICSC-31) (Innsbruck, Austria)
- Trace Elements in Food, 3rd International Symposium on (TEF-3) (Rome, Italy)
- Vacuum Microbalance and Thermoanalytical Techniques (IVMTTC-32), 32nd International Conference on (Lublin, Poland)
- Vanadium, 6th International Symposium (Lisbon, Portugal)

\* These events benefited from IUPAC support under the Financial Support of Conferences (FSC) program (see page 11 for details).

IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.

From IUPAC's inception, the inclusion of the word "applied" in its name has signaled a strong tie to the chemical industry. IUPAC has long had a formal program of Company Associates and a Committee on Chemistry and Industry (COCI), which concentrates its efforts on programs and issues pertinent to industrial interests and concerns. Many of the benefits accruing to industry from IUPAC activities are indirect. For example, the conferences described in this report explore new developments in many areas of chemical science and are well-attended by industrial, as well as academic, chemists. Likewise, the global issues discussed previously are of crucial importance to industry. Thus, IUPAC's efforts to provide a sound and unbiased evaluation of current science can have an impact on industrial processes and products in many countries.

COCI has continued its highly successful safety training program and workshops. The IUPAC-UNESCO-UNIDO Safety Training Program allows experts from developing countries to learn about safety and environmental protective measures by visiting and working in plants of IUPAC Company Associates in the developed world. Each scientist or engineer accepted into the program typically spends one to three weeks in training. The fourth Safety Training Program Workshop was held as part of the IUPAC Congress in Glasgow in August 2009, at which five STP Fellows and two experts in chemicals management presented papers and posters on their work.


A new initiative has been established to engage IUPAC and the chemical industries in discussions of mutual benefit, with two regional workshops titled "Chemistry in a Changing World – New Perspectives Concerning the IUPAC Family" held in Western Europe and East Asia. At each of these workshops, representatives of regional IUPAC Company Associates, national chemical societies, and chemical industry organizations met to share experiences, express their needs, and hear from IUPAC leaders about efforts to address relevant issues in the chemical sciences. The workshops

provided a valuable forum for sharing information about the chemical industries in individual countries in the region, which allowed attendees to increase their understanding of the similarities and differences between those nations.

During the past 20 years, IUPAC has sponsored a series of regional workshops focused on broadening the adoption of harmonized international approaches to crop protection chemistry research and regulation in developing countries. The workshops create a forum where IUPAC project outcomes, as well as recommendations from other international bodies, can be discussed and applied within the context of local environmental issues. Following successful sessions in Thailand, Taiwan, Brazil, Korea, Costa Rica, and China (twice), the eighth workshop, "Crop Protection Chemistry in Latin America: Environment, Safety, and Regulation," was held in Brazil in 2009.



The IUPAC-Richter Prize in Medicinal Chemistry was established by a generous gift from the Chemical Works of Gedeon Richter Plc. (Budapest, Hungary) to acknowledge the key role that medicinal chemistry plays in improving human health. By establishing this prize jointly with IUPAC, Richter has contributed to the international recognition of the role of research in medicinal chemistry, while publicizing the company's commitment to medicinal chemistry research and fur-



ther promoting IUPAC activities. The prize of USD 10 000 is awarded to an internationally recognized scientist, preferably a medicinal chemist, whose activities or published accounts have made an outstanding contribution to the practice of medicinal chemistry or have led to an outstanding example of new drug discovery. The prize is awarded biennially by a selection committee appointed by the Subcommittee on Medicinal Chemistry and Drug Development of the IUPAC Chemistry and Human Health Division.

The 2008 IUPAC-Richter Prize in Medicinal Chemistry was awarded to Jan Heeres, formerly of the Centrum for Molecular Design and Janssen Pharmaceutica in Beerse, Belgium. Heeres received this award in recognition of his outstanding medicinal chemistry contributions to new drug discovery while at Janssen Pharmaceutica, most notably for the discovery of ketoconazole, the first orally active broad-spectrum imidazole antimycotic. Heeres was also involved in the discovery of various other important antifungal azole drugs over a period of 20 years, such as econazole, miconazole, isoconazole, carnidazole, azanocazole, parconazole, terconazole, propiconazole, itraconazole and saperconazole. The IUPAC-Richter Prize was presented on 18 June 2008 at the American Chemical Society's 31st National Medicinal Chemistry Symposium in Pittsburgh, Pennsylvania, USA. The plaque was signed by Professor Jung-Il Jin, president of IUPAC; Erik Bogsch, chief executive officer of Gedeon Richter Plc.; and Professor Robin Ganellin, chair of the IUPAC-Richter Prize selection committee.

Professor Craig J. Hawker, director of the Materials Research Laboratory at the University of California, Santa Barbara, USA, was awarded the 2008 DSM Performance Materials Award in recognition of his exceptional contributions to the advancement of materials science. Professor Hawker is one of the world's leading scientists in the field of polymeric performance materials. His outstanding fundamental and applied research and his dedication to innovative



science have earned him a high reputation and a large following in the academic world. An international judging committee, chaired by Professor Joseph Put, chief technology officer of DSM, selected Professor Hawker from several candidates proposed by an international nomination committee. Professor Hawker received the award—which carries a cash prize of EUR 50 000—from Professor Put at the IUPAC Macro 2008 Congress in Taipei on June 30. In presenting the award, Professor Put said, “A real paradigm shift took place in synthetic chemistry in the past 15 years, which resulted in the building up of well-defined large functional systems mimicking biological systems. This was made possible by a combination of very well-controlled chemistry, non-covalent interactions, and biotechnological approaches. Professor Hawker played a vital role in this development, both by opening up new synthetic pathways and by looking into possible applications in microelectronics and biomedical science.”

IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.

IUPAC's constituency consists of the entire world of chemistry, both organizational and individual. Official contacts are maintained with the National Adhering Organizations, but there is also a need for contact with national chemical societies, industrial companies, and individual chemists. Such widespread contact requires both web-based and conventional forms of communication.

The IUPAC web site serves as a major vehicle for worldwide communication. News from and about IUPAC, full listings of current and completed projects, detailed committee membership information, publications, and conference calendars are updated regularly. In addition, links to national chemical web sites, Company Associates, and Associated Organizations provide a facile means for chemists to remain aware of a wide range of international activities. The bimonthly IUPAC news magazine, *Chemistry International*, is a vibrant, informative, and popular publication. It is distributed in print form to chemists in nearly 100 countries and is also available online. The magazine serves as a major means of publicity and communication, and current issues are distributed at IUPAC conferences.

IUPAC has formal and informal ties to international organizations that impinge on every aspect of individual and commercial society, such as the International Organization for Standardization (ISO), International Committee on Weights and Measures (BIPM), International Federation of Clinical Chemistry and Laboratory Medicine, World Health Organization, and various committees of ICSU. These contacts permit the voice of chemistry to be heard when international standards in a variety of fields are promulgated. Because it is important that the promotion of chemistry goes hand-in-hand with the wider promotion of science, IUPAC has moved to strengthen its ties with the International Council for Science (ICSU) and to play a greater role in its activities.

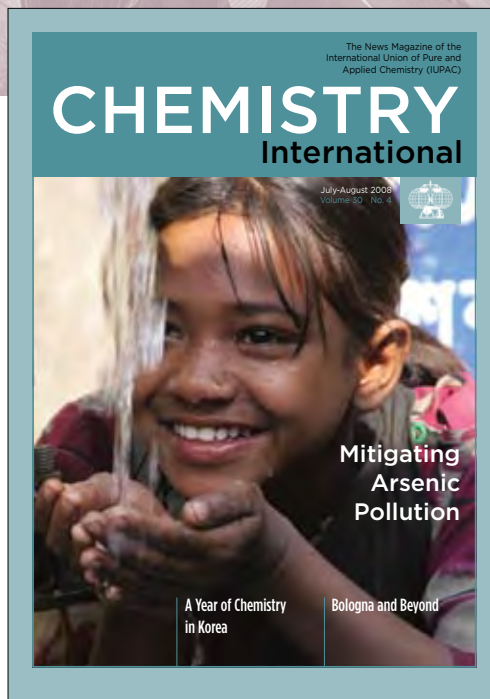
In 2008, for the first time, a generous grant of USD 10 000 from IUPAC helped economically disadvantaged countries participate in the 40th International Chemistry Olympiad (IChO). The Steering Committee of the IChO allocated the money to cover travel expenses and participation fees of seven Central Asian and Latin American nations. IUPAC President Jung-Il Jin traveled to Budapest for the occasion. In 2009, the IChO took place in Cambridge, England, UK, and IUPAC Vice President Nicole Moreau took part in the closing ceremony.



*Students from around the globe participated in the International Chemistry Olympiad, which features theoretical and practical exams designed to challenge students' creativity.*



In specific circumstances, IUPAC provides financial support to promote the participation of international expert lecturers or young scientists and advanced students in selected conferences. The Financial Support for Conferences (FSC) program provides modest financial support, awarded on a competitive basis, to conferences intended to have an impact on scientifically emerging regions or to support a focus on new ideas in chemistry. In 2008–09, IUPAC supported eight events—six under the Scientifically Emerging Regions (SER) program and two under New Directions in Chemistry (NDC).



## FINANCIAL SUPPORT FOR CONFERENCES (FSC) 2008–09

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Agrochemicals protecting Crop, Health and Natural Environment, International Conference on (New Delhi, India) (SER)

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Chemistry in a Globalized Society, International Conference on Chemical Education Satellite Workshop on the Relevance of (Pointe Aux Piments, Mauritius) (SER)

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Improving Chemical Education in the Philippines, Conference on (Manila, Philippines) (SER)

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Interactions of Soil Minerals with Organic Components and Microorganisms, International Symposium of (ISMOM 2008) (Pucon, Chile) (NDC)

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Molecular Environmental Soil Science at the Interfaces at the Earth's Critical Zone, International Symposium of (Hangzhou, China) (SER)

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Molecular Order and Mobility in Polymer Systems, 6th International Symposium (St. Petersburg, Russia) (NDC)

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POLYCHAR 16 - World Forum on Advanced Materials (Lucknow, India) (SER)

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Polymers and Advanced Materials, 10th International Conference on Frontiers of (Santiago, Chile) (SER)

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IUPAC will utilize its global perspective and network to contribute to the enhancement of chemistry education, the career development of young chemical scientists, and the public appreciation of chemistry.

IUPAC recognizes its responsibility to encourage and support young scientists throughout the world. Each year since 2000, the IUPAC Prize for Young Chemists has been awarded for the best Ph.D. theses in the chemical sciences in the previous year. The IUPAC Prize for Young Chemists is the only international program designed to provide public and financially remunerative recognition to chemists at such early stages of their careers. Over 10 years, 46 awards have been made through a highly competitive selection process; each award provides USD 1000 and covers travel expenses for the winner to present a poster and receive the award at an IUPAC Congress. In Glasgow in 2009, 10 young scientists (five each from 2008 and 2009) received awards for innovative research in wide-ranging areas. An additional nine applicants, four in 2008 and five in 2009, were awarded Honorable Mentions, in recognition of the extremely high quality of the competitors.

The Young Ambassadors for Chemistry (YAC) program was established as a partnership between the IUPAC Committee on Chemistry Education (CCE) and Science Across the World. Using a train-the-trainer approach, YAC facilitators have worked with teachers and students to increase public appreciation for and understanding of chemistry in Argentina, Bulgaria, Egypt, Jordan, Korea, Lithuania, Russia, South Africa, and Taiwan. Two successful YAC events were held in 2008: one in April in Nicosia, Cyprus, and the other in August in Mauritius. The activities from these events have catalyzed new programming in the ministry of education.

The third Flying Chemists Program visit took place in April 2008 in the Philippines, following an organizational workshop six months earlier coordinated by the CCE Chemistry Education for Development subcommittee. With the common goal of improving teaching and learning of chemistry at the tertiary level in the Philippines, a group of 324 chemistry teachers—representing 89 institutions from across

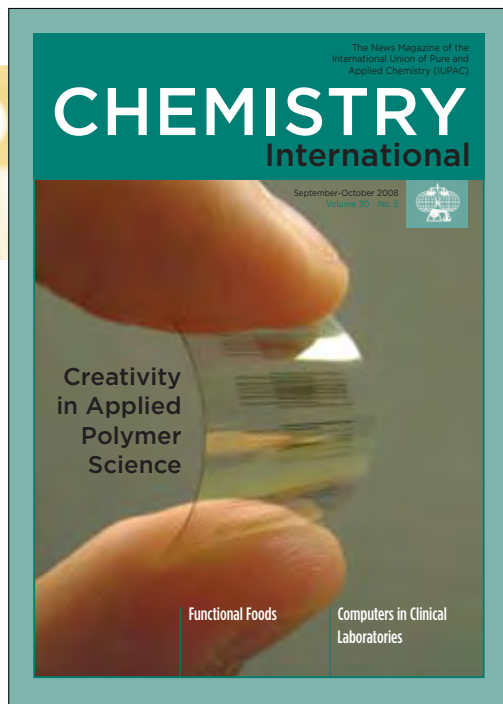
the country—came together for a two-day event organized by the Commission on Higher Education, the government body overseeing higher education institutions in the Philippines, in cooperation with the Kapisanang Kimika ng Pilipinas (Chemical Society of the Philippines) and the University of Santo Tomas. Among the participants were 12 young chemistry teachers who received travel grants through the IUPAC program on Financial Support for Conferences.

IUPAC provides travel support to encourage young scientists, especially from developing countries, to participate in its biennial Congress. In 2009, IUPAC joined with the organizers of the Glasgow Congress to support travel for 50 young chemical scientists from around the world. Each scientist presented a poster or lecture and participated in the full range of Congress sessions. In addition, 22 young scientists were selected to participate as Observers in the General Assembly.

The CHEMRAWN VII prize for Atmospheric and Green Chemistry was established in 2009. Beginning in 2010, the prize of USD 5000 will be awarded every two years to a young investigator from a developing country and presented at the International Conference on Green Chemistry. This prize was announced at the IUPAC Council in August 2009, and nominations for the first prize were due on 31 December 2009.

The 2008 Thieme–IUPAC Prize was awarded to F. Dean Toste of the University of California, Berkeley, USA. As the ninth recipient of the prize, Professor Toste joins a select group of scientists under the age of 40 whose research has had a major impact on the field of synthetic organic chemistry. The prize, which is awarded every two years and consists of EUR 5000, was presented to Professor Toste at his award lecture on 24 June 2008 at the ICOS-17 conference in Daejeon, Korea.

Professor Zhenan Bao, Department of Chemical Engineering, Stanford University, USA, was awarded

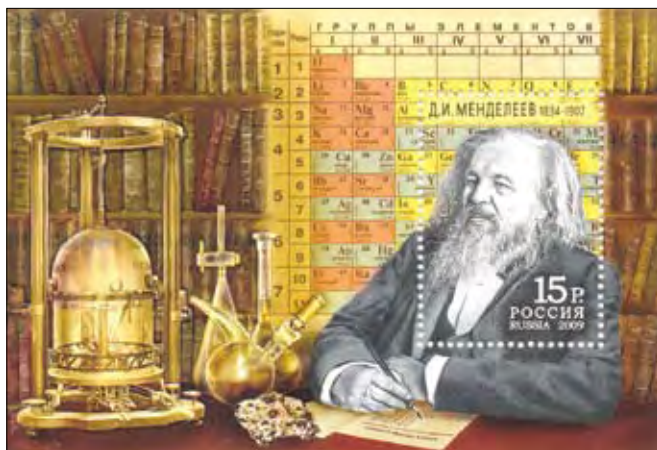


the first *Polymer International*-IUPAC Award for creativity in applied polymer science or polymer technology. This award recognizes the achievements of young researchers in the polymer industry. Professor Bao is a world leader in the field of organic and polymer electronics. She was formerly a Distinguished Member of Technical Staff in the Materials Research Department of Bell Labs, Lucent Technologies at Murray Hill, New Jersey, USA.

Professor Bao pioneered the materials design concepts for high charge transport properties in polymer semiconductors and air-stable organic semiconductors that can be processed using solution techniques. This work led to the first demonstration of all-printed organic transistors, and her group was the first to demonstrate all-printed plastic circuitry, thereby opening a new era in electronics. Under her leadership, Professor Bao's group has developed new dielectric material systems and a new type of water-stable sensor. Professor Bao presented her award lecture, "Polymers for Flexible Electronics," on 4 July 2008 at the World Polymer Congress in Taipei.

In February 2009, the world community celebrated the 175th anniversary of the birth of Russian scientist Dmitri Ivanovich Mendeleev (1834–1907). Participating in the anniversary celebrations was IUPAC President Jung-Il Jin. His appearance in the great hall of the Russian Academy of Science was

met by thunderous applause. In his lecture, Professor Jin emphasized the outstanding results Mendeleev achieved in different fields of science: chemistry, physics, hydrodynamics, meteorology, isomorphism, mineralogy, investigation of resources, geology, oil production, economics, aeronautics, Arctic exploration, state education, judicial expertise, cheese-making, development of a customs tariff, and much more. Professor Jin also emphasized the role of Russian chemical scientists in modern science, and he noted that, throughout the years, there have always been distinguished Russian scientists participating in the work of IUPAC.



*In 2009 the Russian Post, the country's state postal system, produced souvenir postage stamps in celebration of the life of D.I. Mendeleev.*

IUPAC will broaden its national membership base and will seek the maximum feasible diversity in membership of IUPAC bodies in terms of geography, gender, and age.

At the organizational level, IUPAC communicates with its National Adhering Organizations and continually strives to bring additional countries into the fold. The number of National Adhering Organizations was 53 at the end of 2009. The members of IUPAC bodies in 2008–9 represented more than 70 countries. Although member countries generate about 85% of the world's chemical output, there are several countries with a substantial chemistry enterprise that are not yet members of the Union. The current Associate National Adhering Organizations are being vigorously encouraged to move to National Adhering Organization status in the immediate future.

The statutes, bylaws, and standing orders have been revised slightly, and these changes were approved by the council at its last meeting in Glasgow, Scotland, UK, on 5–6 August 2009. The bylaws now permit greater flexibility related to the timing of membership, allowing new NAOs to more readily take an active role in the business of the Union.

Members of IUPAC's governing bodies and various committees are selected primarily on the basis of needed expertise, but special efforts are made to assure diversity in terms of geography, gender, and age. At the division level, elections are held for Titular Members, and once this group is established, Associate Members are added to cover further areas of expertise. Finally, the National

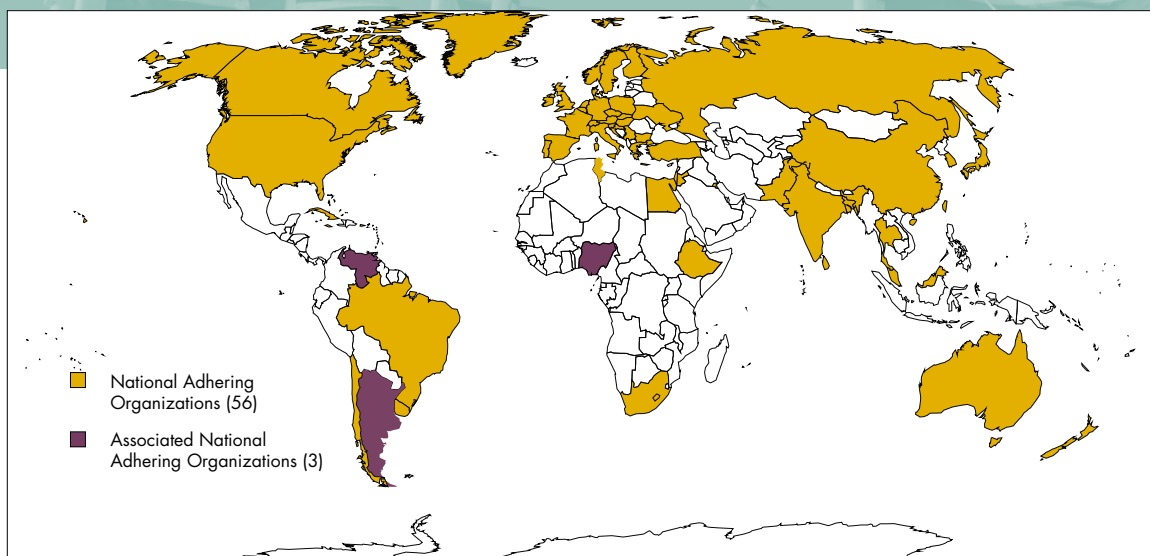
Representatives are chosen deliberately to add members from countries not otherwise included. The purpose of the election process and the committee structure is to seek maximum inclusion and communication, rather than narrow national representation. In this way, even smaller chemical countries can become fully involved in the work of IUPAC.

Various programs have been put in place by National Adhering Organizations to interest mid-career younger chemists in IUPAC work and to arrange for their participation as observers in committee meetings during the General Assembly. IUPAC, together with the Canadian and USA National Adhering Organizations, selected 22 chemists with varied backgrounds and interests from 10 countries—Bangladesh, Canada, China, India, Israel, Italy, Pakistan, Poland, Thailand, and USA—as Young Observers. Their participation



*Friends of IUPAC from around the world gathered in the Glasgow Science Center for the 2009 General Assembly Welcome Reception.*





As of 3 March 2010, IUPAC counts 56 full members, or National Adhering Organizations (NAOs), and three Associated National Adhering Organizations (ANAOs). The most recent adhering members are Cyprus (3 March 2010), Tunisia (4 February 2010), and Luxembourg, Malaysia, Sri Lanka, and Thailand (1 January 2010).

added vitality and a valuable perspective to the committee work in which they participated.

IUPAC reaches out to individual chemists and other organizations to enhance its global impact. More than 30 international scientific organizations are currently IUPAC Associated Organizations. These organizations range from regional chemistry federations to societies dedicated to a specific sub discipline of chemistry.

At the individual chemist level, IUPAC has direct contact with approximately 4500 interested scientists in more than 70 countries through its Affiliate Member Program. Formed in 1983, this program permits individual chemists—directly or through their national chemical societies—to express interest in IUPAC's work and to remain informed of IUPAC activities. Each Affiliate Member receives the bimonthly news magazine *Chemistry International*, along with other communications from the IUPAC Secretariat.

The IUPAC Fellows Program, established in 1997, offers Fellow status to individuals who have completed service on IUPAC bodies. Currently, there

are more than 1600 IUPAC Fellows. These scientists receive *Chemistry International* and are invited to participate in two-way communication with IUPAC bodies on important issues to which IUPAC might make a significant contribution.

Because proposals for projects are sought globally, members of task groups that carry out projects may come from anywhere, even countries not currently associated with IUPAC, thus broadening the Union's global reach. Likewise, information that is disseminated at IUPAC-sponsored conferences serves to acquaint a wider circle of chemists with IUPAC's work and to encourage their participation.

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Al Sanea Chemical Products, (Kuwait)  
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Committee on Chemistry and Industry	Mark C. Cesa (2006–2009)	Michael J. Dröschner (2010–2013)
Committee on Printed and Electronic Publications	Leslie Glasser (2004–2009)	David Martinsen (2010–2013)
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Project Committee	H. Kipton J. Powell (2008–2011)	—
Evaluation Committee	Ron D. Weir (2006–2009)	Anders Kallner (2010–2011)

## Mission

IUPAC is a non-governmental organization of member countries that encompasses more than 85% of the world's chemical sciences and industries. IUPAC addresses international issues in the chemical sciences utilizing expert volunteers. IUPAC provides leadership, facilitation, and encouragement of chemistry and promotes the norms, values, standards, and ethics of science and the free exchange of scientific information. Scientists have unimpeded access to IUPAC activities and reports. In fulfilling its mission, IUPAC effectively contributes to the worldwide understanding and application of the chemical sciences, to the betterment of the human condition.

## National Adhering Organizations

Australian Academy of Science ( <i>Australia</i> )	Jordanian Chemical Society ( <i>Jordan</i> )
Österreichische Akademie der Wissenschaften ( <i>Austria</i> )	Korean Federation of Science and Technology Societies ( <i>Korea</i> )
Bangladesh Chemical Society ( <i>Bangladesh</i> )	Kuwait Chemical Society ( <i>Kuwait</i> )
The Royal Academies for the Sciences and Arts of Belgium ( <i>Belgium</i> )	Fonds National de la Recherche ( <i>Luxembourg</i> )
Brazilian Chemistry Committee for IUPAC ( <i>Brazil</i> )	Institut Kimia Malaysia ( <i>Malaysia</i> )
Bulgarian Academy of Sciences ( <i>Bulgaria</i> )	Koninklijke Nederlandse Chemische Vereniging ( <i>Netherlands</i> )
National Research Council of Canada ( <i>Canada</i> )	Royal Society of New Zealand ( <i>New Zealand</i> )
Sociedad Chilena de Química ( <i>Chile</i> )	Norsk Kjemisk Selskap ( <i>Norway</i> )
Chinese Chemical Society ( <i>China</i> )	Chemical Society of Pakistan ( <i>Pakistan</i> )
Chemical Society located in Taipei ( <i>China</i> )	Polska Akademia Nauk ( <i>Poland</i> )
Croatian Chemical Society ( <i>Croatia</i> )	Sociedade Portuguesa de Química ( <i>Portugal</i> )
Sociedad Cubana de Química ( <i>Cuba</i> )	Colegio de Químicos de Puerto Rico ( <i>Puerto Rico</i> )
Panycyprian Union of Chemists ( <i>Cyprus</i> )	Russian Academy of Sciences ( <i>Russia</i> )
Czech National Committee for Chemistry ( <i>Czech Republic</i> )	Serbian Chemical Society ( <i>Serbia</i> )
Det Kongelige Danske Videnskabernes Selskab ( <i>Denmark</i> )	Slovak Chemical Society ( <i>Slovakia</i> )
National Committee for IUPAC ( <i>Egypt</i> )	Slovenian Chemical Society ( <i>Slovenia</i> )
Chemical Society of Ethiopia ( <i>Ethiopia</i> )	National Research Foundation ( <i>South Africa</i> )
Suomen Kemian Seura—Kemiska Sällskapet i Finland ( <i>Finland</i> )	Ministerio de Educación y Ciencia ( <i>Spain</i> )
Comité National Français de la Chimie ( <i>France</i> )	Institute of Chemistry, Ceylon ( <i>Sri Lanka</i> )
Deutscher Zentralausschuss für Chemie ( <i>Germany</i> )	Svenska Nationalkommittén för Kemi ( <i>Sweden</i> )
Association of Greek Chemists ( <i>Greece</i> )	Swiss Chemical Society ( <i>Switzerland</i> )
Hungarian Academy of Sciences ( <i>Hungary</i> )	Chemical Society of Thailand ( <i>Thailand</i> )
Indian National Science Academy ( <i>India</i> )	Société Chimique de Tunisie ( <i>Tunisia</i> )
Royal Irish Academy ( <i>Ireland</i> )	Türkiye Kimya Dernegi ( <i>Turkey</i> )
Israel Academy of Sciences and Humanities ( <i>Israel</i> )	National Academy of Sciences of Ukraine ( <i>Ukraine</i> )
Consiglio Nazionale delle Ricerche ( <i>Italy</i> )	Royal Society of Chemistry ( <i>United Kingdom</i> )
Caribbean Academy of Sciences—Jamaica Chapter ( <i>Jamaica</i> )	National Academy of Sciences ( <i>USA</i> )
Science Council of Japan ( <i>Japan</i> )	Programa de Desarrollo de Ciencias Básicas ( <i>Uruguay</i> )



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