Report to Council. IUPAC Division III: Organic and Biomolecular Chemistry. June 2003

I. Executive Summary

The Division of Organic and Biomolecular Chemistry occupies a central position that is well suited to fulfilling the missions of IUPAC. We are organized into six Subcommittees, which allow us to focus our attention on particular goals of IUPAC. These Subcommittees are responsible for the promoting new project proposals, organizing conferences, collaborations and liaison with other IUPAC bodies, and for serving chemistry in their sub-specialty worldwide. The Division Committee coordinates the activities of the Subcommittees, and most members of the Division Committee also serve on Subcommittees, which are listed below:
Subcommittee on Organic Synthesis (Chair: David Black, Australia)
Subcommittee on Biomolecular Chemistry (Chair: Vadim Ivanov, Russia)
Subcommittee on Green Chemistry (Chair: Pietro Tundo, Italy)
Subcommittee on Photochemistry (Chair: Sylvia Braslavsky, Germany)
Subcommittee on Structural and Mechanistic Chemistry (Chair: Marek Krygowski, Poland)
Subcommittee on Biotechnology (Chair: In process of selection)

The strategic position of Organic and Biomolecular Chemistry is emphasized by the most recent Nobel Prizes in chemistry, awarded since the Brisbane Assembly. That in 2001 was to Noyori, Sharpless, and Knowles "for their work on chirally catalysed hydrogenation reactions" and "chirally catalysed oxidation reactions", while that for 2002 was “for the development of methods for identification and structure analyses of biological macromolecules” to Fenn, Tanaka, and Wüthrich. Of course these discoveries involve not only Organic and Biomolecular Chemistry but also many other areas of chemistry, which possess a fundamental unity.

The Subcommittees are responsible for overseeing a number of long-running conferences sponsored by IUPAC, and such conferences play a vital role in achieving the missions of IUPAC, as they occur in many locations around the world and play a major role in promoting chemical research, education, the involvement of large numbers of chemists of diverse ages and backgrounds with IUPAC, and the promotion of industrial / academic collaboration. In 2002 there were five such conferences with a major organizational role by the Division, in Physical Organic, Synthesis, Photochemistry, Natural products, and Biomolecular, and their successors in 2004 are already being organized. In addition the Division participates in a number of other conferences, and details are given in Part 4.

There is no substitute for personal contact and the Subcommittees are encouraged to have meetings at IUPAC sponsored conferences and in conjunction with IUPAC Assemblies if possible. While this has been successful in most cases for the

conferences this is less so with the Assemblies, as only a few individuals outside the Titular members of the Division Committee are able to attend, even with the attraction of the scientific Congress. To encourage such attendance these individuals are invited as observers to the Division Committee meetings.

Our Subcommittees are highly interdisciplinary, and have many links with other Divisions. For example, we are concerned with chemical processes in the environment through our Subcommittee on Green Chemistry, and with Materials Chemistry through our Subcommittee on Structure and Mechanism with representation on the Interdivisional Working party on Materials.

The Division is currently financially supporting 10 projects, and these deal with a diverse range of topics, including fundamental chemical research, green chemistry, human health, nomenclature (a traditional part of our Division until the establishment of the new Division VIII, and still of vital interest), and education.

In addition, members of our Division have taken an active part in IUPAC activities such as the chemical weapons treaty, education, materials, and revision of the IUPAC governance.

II. Activities for 2002-2003

These are included with the six parts of the IUPAC mission statement to show the fit with IUPAC goals.

a. *IUPAC will provide leadership as a worldwide scientific organization that objectively addresses global issues involving the chemical sciences.* Members of the Division participated in the Bergen meeting on the “Impact of Scientific Developments on the Chemical Weapons Convention”, and have played a significant role in organizing conferences on Biodiversity. Many of our current and recently completed projects focus on global issues; for example, "Green Chemistry in Latin America", "South East Asian, and neighbouring countries, Green Chemistry network", "An IUPAC Coordinated web page on Green/Sustainable Chemistry", " Fighting microbial resistance through development of new antimicrobial agents, directed against specific targets", and " Post-genomic Chemistry".

b. *IUPAC will facilitate the advancement of research in the chemical sciences through the tools that it provides for international standardization and scientific discussion.* We are participating in the project “NMR Chemical Shifts: updated conventions”, an updated "Glossary of Terms Used in Photochemistry", and have Glossaries in other fields such as Physical Organic Chemistry and Protecting Groups that are to be updated.

c. *IUPAC will assist chemistry-related industry in its contribution to sustainable development, wealth creation, and improvement in the quality of life.* Our conferences always include

substantial industrial participation, and we have four current or completed projects on Green and sustainable chemistry.

d. *IUPAC will foster communication among individual chemists and scientific organizations, with special emphasis on the needs of chemists in developing countries.* As noted our conferences provide a major opportunity for chemists from around the world and from different stages in their careers to come together. Also many of our current and completed projects are focussed on developing countries and regions, and allow the participation of individuals from these areas. Our projects and conferences in the area of biodiversity and in sustainable chemistry are also of great relevance to developing countries, and involve numerous individuals from these areas.

e. *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.* We have a current project " Toward a core organic chemistry curriculum for Latin American universities", and also strive to include younger chemists in our conferences. We are happy to invite Young Observers sponsored by various NAOs to attend the Assemblies to participate in our Divisional and Subcommittee Meetings.

f. *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.* Our Division has been committed to these goals for some time, as witnessed by our current 26 members (14 Titular, 5 Associate, 5 National Representatives, 2 Provisional) who are from 23 countries (Asia 5), Europe (10), Africa (3), North America (2), South America (2), and Australia (1). Only 5 are female but we expect to increase this representation. We are always conscious of the need to recruit younger chemists, but recognize that these individuals usually need to devote most of their energies to establishing their careers. In addition our Subcommittees include 73 additional individuals, many of them younger chemists.

III. Other information

Divisional goals

1. *Encouraging the development of more project proposals.* While we are pleased to financially support 10 current projects it is clear that many potential proposers of projects are not sufficiently informed or motivated to present proposals, and better communication with our members and those outside IUPAC is needed to encourage the formulation of creative and worthwhile projects.

2. *Improved communication with the chemical community*. Our Conferences offer the opportunity to make the work of the Division known to chemists in many parts of the world and in many different disciplines. We hope to utilize these more effectively to publicize our work and the opportunities for chemists worldwide to contribute to

IUPAC. One way to do this is with a new brochure to be distributed at meetings describing our work.

3. *Continued enhancement of the role of our Subcommittees.* The Subcommittees are our principal channel for engaging a large number of active chemists worldwide in the work of IUPAC. Overall our Subcommittees are functioning very successfully, and we will continue to ensure these are kept vital, with the continual recruitment of new members and leadership.

4. *Improved relations with the National Adhering Organizations.* We wish to enhance the interactions of our Division with the NAOs, as this provides another means of communication with working chemists around the world so we can be responsive to their needs.

5. *Promotion of IUPAC Prizes in Organic Chemistry*. Our Subcommittee on Organic Synthesis now coordinates the Thieme-IUPAC Prize in Organic Synthesis, and the IUPAC Prizes for the best Ph. D. theses have proven to be valuable for enhancing chemistry worldwide. It appears desirable to promote other comparable international awards, and the Division is seeking sponsors of IUPAC awards in such areas as Structural and Mechanistic Organic Chemistry, Biomolecular Chemistry, and Green Chemistry.

IV. Tabular Material

Current projects

1. Post-genomic Chemistry. 2001-005-300. (S. D. Varfolomeyev). Joint with Division VII.
2. Fullerene Nomenclature Part II. 2001-014-1-800 (W. H. Powell). Now Division VIII.
3. Toward a core organic chemistry curriculum for Latin American universities. 2002-010-1-050. (Norma Nudelman). Joint with CCE.
4. Green Chemistry in Latin America. 2002-064-1-300. (P. Tundo)
5. Glossary of Terms Used in Photochemistry. 2002-024-1-300. (S. Braslavsky) Joint with Division I.
6. South East Asian, and neighbouring countries, Green Chemistry network. 2002-028-1-300. (Janet L. Scott)
7. An IUPAC Coordinated web page on Green / Sustainable Chemistry. 2002-029-1-300. (P. Tundo)
8. Fighting microbial resistance through development of new antimicrobial agents, directed against specific targets. 2002-030-1-300. (Gerrit-Jan Koomen)
9. NMR chemical shifts: updated conventions. 2003-006-1-100 (Robin K. Harris). Joint with Divisions I & II.
10. Chemical actinometry. 2002-008-1-300. (S. E. Braslavsky). Joint with Division I.
11. Glossary of terms in photocatalysis and radiation. 2001-036-1-300 (V. N. Parmon and J. R. Bolton). Joint with Division I.

12. Glossary of terms and basic protocols used in photodynamic therapy. 2001-020-1-300. (David Phillips).
13. Alignment of nomenclature in areas of overlap between the preferred names for organic nomenclature and the revision of the nomenclature of inorganic chemistry. 2001-031-1-800. (T. Damhus). Now Division VIII.
14. Space- and time-resolved fluorescence spectroscopy and photochemistry. 2001-018-1-300. (Hiroshi Masuhara)
15. Single molecule spectroscopy. 2000-012-1-300 (F. C. De Schryver). Joint with Division I.
16. Tems and Units in UV Light Disinfection. 2001-036-1-300 (J. R. Bolton).

Completed Projects

1. Molecular Basis of Biodiversity, Conservation, and Sustained Innovative Utilization. 1999-036-1-300 A. E. Fischli, U. K. Pandit, and D. St C. Black. Pure Appl. Chem., **74**, 697-702 (2002).
2. Fullerene Nomenclature, Part I. 310/24/98. F. Cozzi and W. H. Powell. Pure Appl. Chem. **74**(4), 629-695, 2002.
3. Phane Nomenclature, Part II. 310/26/98. H. Favre and W. H. Powell. Pure Appl. Chem. **74**(4), 809-834, 2002.
4. Green Chemistry in Africa 2002-018-1-300 The book co-edited by P. Tundo and L. Mammino has been published by INCA. July 2002 (ISBN 88-88214-07-0).
5. Development of guidelines for the transmission of information on organic synthesis (Abbreviation guidelines and glossary of terms for protecting groups in synthesis) 301/1/93. D. S. C. Black (in review)

Continuing Conferences

16th IUPAC Conference on Physical Organic Chemistry: 2002, San Diego, USA; 17th 2004, Shanghai; 2006, Warsaw, Poland.
6th IUPAC Conference on Biomolecular Chemistry: 2002, Toronto, Canada; 7th 27 June-1 July 2004, Sheffield, UK.
IUPAC Conference on Synthetic Organic Synthesis: 2002, Christchurch, NZ; 1-6 August 2004, Nagoya, Japan; 11-5 June 2006 Merida, Mexico.
XIX International Conference on Photochemistry. 2002, Budapest, Hungary; XX 17-22 July 2004, Granada, Spain.
12th IUPAC International Conference on Organometallic Chemistry for Organic Synthesis. 6-10 July 2003, Toronto, Canada.
XX International Conference on Organometallic Chemistry. 7-12 July 2002, Corfu, Greece.
23rd IUPAC International Conference on the Chemistry of Natural Products (ISCNP). 2002, Florence, Italy.
IUPAC International Conference on Biodiversity (ICOB-4) and Natural Products (ISCNP-24), 26-31 January 2004, New Delhi, India; 2006 Okinawa, Japan (proposed).
3rd Florida Heterocyclic Conference. 2002, 4th 2003, 5th 2004, Gainesville, USA.

13th European Symposium on Organic Chemistry, 10-15 Sep 2003, Dubrovnik, Croatia.
12th International Biotechnology Symposium, 17-22 October 2004, Santiago, Chile.
16th International Conference on Phosphorus Chemistry, 4-9 July 2004, Birmingham, UK.
(and others)