

**QUADRENNIAL REPORT OF THE COMMITTEE ON
ELECTRONIC INFORMATION AND COMMUNICATION
(CEIC)
OF THE INTERNATIONAL MATHEMATICAL UNION
APRIL, 2006**

The CEIC is a standing advisory committee to the Executive Committee of the International Mathematical Union. Its goals include making the issues involved generally understood; to define the relevant needs of our discipline clearly; to shape the role the mathematical community needs to play; and to guide the practice of scholarly communication and publication. More specifically, the Committee is to take an active part in any development of a Digital Mathematics Library, and to further address copyright and archiving issues, journal licensing models, and cost models for journal production and acquisition. As one consequence the CEIC has developed and maintains several websites:

- **CEIC** at <http://www.ceic.math.ca>
- **WDML** at <http://www.ceic.math.ca/WDML>
- **FWDM** currently at <http://www.cs.dal.ca/ddrive/fwdm>
- **EWDM** at <http://www.mathunion.org/ewdm/>

The CEIC has met face-to-face as a committee on four occasions since the Shanghai General Assembly, nine occasions in all since its inception at Dresden; three of its meetings took place in the context of workshops/conferences on issues within the Committee's remit.

Best Practice Statements. The CEIC had prepared detailed Best Practice recommendations, eventually adopted by in Shanghai, 2002. The CEIC prepared a revised and updated version of the recommendations; those revisions were endorsed by the EC at its 72nd meeting in Oxford, 2004; see <http://www.ceic.math.ca/Publications>.

Implementing of the recommendations in this document is not only an important way to enhance general mathematical practices. In developing countries, it is also essential as a means to improve communication and access to the resources and activities of the international mathematics

community. Because scholarly communication is changing rapidly, there is great urgency to these efforts.

The revised recommendations have been enriched by an addendum on Journal Pricing, see <http://www.ceic.math.ca/Publications/Recommendations/Journalprices.shtml>; addenda in preparation include comments on Versioning; Citations, Impact Factors, and other Misleading Statistics; Advice to Authors, Referees, Editors, and Publishers; Advice to small Society publishers and to Publishers of individual journals. Several related topics have been identified for future work. As important part of its WDML remit, in 2005 the Committee completed a statement on Best Practices for Retrodigitization, see http://www.ceic.math.ca/Publications/retro_bestpractices.pdf.

World Digital Mathematics Library. The CEIC had noted at its fifth meeting in early 2002, that some half dozen centres in various countries had projects to scan parts of the existing mathematical literature, thus making it available in digital form (retrodigitization). It had determined that the development is of great importance for mathematics and had urged the IMU to accept a central role in the co-ordination and facilitation of this retrodigitization project. Consequently the CEIC was charged by the IMU to co-ordinate the IMU's WDML activities, see <http://www.ceic.math.ca/WDML/>. The Committee assisted in promoting and facilitating the role of the Zentralblatt and Mathematical Reviews in establishing a 'Simple Metadata' standard and provided a new statement 'Best Practices for Retrodigitization'.

A visible outcome is the addition of a quarter of a million links to retrodigitized items, often as part of new entries, in the Zentralblatt and in Mathematical Reviews. A registry of retrodigitized journals, substantially based on the continuing work of Ulf Rehmann, has been created with the help of the AMS.

CEIC members contributed to many related workshops such as: the DML workshop at Göttingen, May, 2003; the 5th EMANI workshop and the 3rd WDML workshop, 'New Developments in Electronic Publishing of Mathematics', Stockholm, June 2004; and the MSRI 'World Digital Mathematics Library' workshop, April, 2005 as well as to presentations at major conferences including ICIAM2003, Sydney and the Mainz, 2005, joint AMS/DMV/ÖMG Meeting.

Federated World Directory of Mathematicians. Federated searching connotes any system that provides a common user interface for searching and retrieving information across heterogeneous datasets over the Internet. In 1998 the CEIC was asked to explore the feasibility of an electronic World Directory of Mathematicians to replace the traditional hard copy. The

CEIC concluded that, while desirable, intellectual property and privacy issues in different countries made this impossible for the 2002 edition of the WDM. With the emergence of better Internet search tools, the CEIC subsequently found it realistic to build a federated directory. What this provides is a rapid and simple search over existing online databases with no additional work for the user; for additional comments and the working model see <http://projects.cs.dal.ca/ddrive/fwdm/index.shtml>. A full version is intended for release at the 2006 ICM.

Electronic World Directory of Mathematicians. Only a limited number of society membership lists are as yet accessed by the FWDM. Mathematicians wishing to make certain that their names and details are nonetheless available to the mathematical community by way of the FWDM have the opportunity to join the EWDM at <http://www.mathunion.org/ewdm/>. Some care has been taken to make this list difficult for automated programmes to access.

Recommendations to the EC. The Committee's terms of reference requested it to draft a proposal, to be decided upon by the EC in 2006, concerning its future status. The proposal was to include issues such as CEIC's institutionalization, membership, long term financing, and sustainability of the various current CEIC efforts and activities.

In reporting to the EC, the Committee emphasized that its primary goals are variously to advise the EC on issues the CEIC believes should be of concern to the mathematical community and on matters explicitly put to it by the EC, and to carry out occasional tasks and maintenance so as to bring such advice into effect. The Committee believes its advisory tasks are paramount. It seems feasible at present that funding required to underwrite tasks undertaken by the Committee, and maintenance of most continuing projects, be found from sources accessible to the Committee's members. The Committee believes its funding for the next four years can be reduced to a level sufficient to do little more than to allow support for the travel of its members to occasional face to face meetings and workshops. It follows that the Committee should remain advisory to the EC, that it remain restricted in size, and that it should consist of an appropriate mix of persons with experience and expertise in the matters relevant to the Committee.

Accordingly, the Committee has advised the EC that there should be a near complete rollover of its membership staged at two-year intervals so as to guarantee appropriate continuity. All but three of its members choose to retire from the Committee this August, the remaining three members agree to maintain their contribution for two more years. Three new persons with varied appropriate experience and expertise have been recommended to join

the Committee to serve for at least four years from August. In addition, a member of the EC is expected to join the Committee as EC representative. In summary, the Committee recommends that the EC reconstitute the Committee so that it consist of seven persons with the three currently continuing members to be replaced by the EC in two years time. The EC can of course choose to add additional members should the need arise. The value of the IMU for the Committee should be reviewed at no more than four yearly intervals.

Other matters for recommendation are implicit in the revised terms of reference for the Committee and in various other matters incidentally touched on in this report.

MEETINGS OF THE CEIC FOR 2003–2006

Berlin, 05/2003. The sixth meeting of the CEIC was held at the Konrad-Zuse-Zentrum (ZIB), Berlin, May 24–25. Several members of the CEIC had earlier attended a meeting to discuss the Digital Math Library initiative at Göttingen, May 21–22.

The CEIC embraced the call of the participants of the Göttingen meeting to endeavour to facilitate the World Digital Mathematics Library initiative on behalf of the mathematical community and took first steps towards that end. The Committee noted that its statement Best Current Practices: Recommendations on Electronic Information Communication of the CEIC (BCP), is an important and successful activity of the CEIC and resolved to provide related documents giving references, links to related material, and relevant examples.

The CEIC considered Intellectual Property Rights/Copyright issues, it resolved to attempt to deal with its task to initiate an electronic version of the World Directory of Mathematicians by looking into the possibility of federated search of available lists of members of mathematical societies, and endorsed details for the new IMU server <http://www.mathunion.org> and for the CEIC website <http://www.ceic.math.ca/>. The Committee established a Technical Advisory Board and resolved to organize a CEIC session at ICIAM 2003.

For a detailed report see http://www.ceic.math.ca/Publications/Minutes/6th_Minutes.pdf.

Durham, NC, 03/2004. The seventh meeting of the CEIC took place at Duke University, March 11–13, 2004. For a detailed report see http://www.ceic.math.ca/Publications/Minutes/7th_Minutes.pdf.

After hearing and discussing status reports on a variety of ongoing projects of the CEIC and on other matters of interest to the CEIC the Committee held a wide-ranging discussion ‘taking stock of the CEIC’ in

order to identify new tasks and current priorities. Subgroups of the Committee carefully drafted agreed Committee statements. Members of the Committee ‘volunteered’ to advance the respective tasks.

The Committee agreed that its present activity should emphasize assisting the mathematical community to inform itself on electronic and information issues. The Committee endorsed a request from the Editors of the *Zentralblatt* and of *Mathematical Reviews* proposing minimal ‘standards for metadata for digitized mathematics’. More generally, the Committee noted its obligation to develop a framework for the WDML dealing with formalization of such matters as aims and principles of the project, formats, functionalities, long-time archiving issues, access, organization, management, copyright, and the like.

The Committee initiated its now regular column ‘IMU on the Web’ with an article concerning its addendum to Best Current Practice Statement #8 on Journal Prices, <http://www.ceic.math.ca/Publications/Recommendations/Journalprices.shtml>.

The Committee resolved to ask the IMU Executive Committee to approve and fund the construction, under CEIC aegis, of a Federated World Directory of Mathematicians (FWDM); see <http://projects.cs.dal.ca/ddrive/fwdm/>.

Grenoble, 03/2005. The eighth meeting of the CEIC, held at Université Joseph Fourier. Grenoble, France, March 11–13, 2005 was preceded by a brief Workshop on Digitization. The CEIC benefited from the participation of IMU president, John Ball, in its deliberations. The Committee determined that Digitization needs a vision statement and that such a statement, to be prepared for the use of the Berkeley meeting on the WDML, must emphasize and explain the benefits of the ‘moving wall’ for making digitized journal materials readily accessible. The CEIC also noted that it is critical to establish a working registry of digitized materials, and of plans and proposals for digitization projects.

The CEIC agreed on the wisdom of a near complete rollover of its membership, perhaps so staged (say at two-year intervals) as to guarantee appropriate continuity, and accordingly resolved to find persons suitable to recommend to the EC as new members of the CEIC from 2006.

The CEIC noted that for mathematics ‘open access’ is not the same thing as ‘author pays’, but is rather a matter of freeing journal content after an appropriate, say five year, period when it plainly has returned the value that can reasonably be expected by its publishers and copyright owners. For details consult http://www.ceic.math.ca/Publications/Minutes/8th_Minutes.pdf.

Berlin, 02/2006. The ninth meeting of the CEIC was scheduled to be contiguous to the meeting of the EC and was held at the Konrad-Zuse-Zentrum (ZIB), Berlin, February 24–26; its afternoon session on Sunday was joined by the EC.

The core task of the meeting was to complete preparation of its report to the EC and of the present report to the IMU. Accordingly the Committee reviewed its activities and confirmed appropriate variants of the decisions tentatively taken at its eighth meeting. Other matters included the CEIC agreeing to continue its regular contribution to IMU-Net and in particular to use IMU on the Web as the Committee’s method of promulgating incidental Best Practice addenda and comments; a number of useful future IMU on the Web topics were agreed to. The Committee decided to look into a project to digitize and make available the proceedings of all past ICMs.

Detailed minutes of the meeting are available at http://www.ceic.math.ca/Publications/Minutes/9th_Minutes.pdf.

MEMBERSHIP AND PARTICIPATION 2002–2006

Jonathan Borwein (Canada), Chair [4/4];

Pierre Bérard (France) [4/4]

John Ewing (USA) [4/4];

Martin Grötschel (Germany) [4/4];

Alejandro Jofre (Chile) [4/4];

Peter Michor (Austria) [4/4];

David Morrison (USA) [4/4];

Alf van der Poorten (Australia) [4/4];

Rolf Jeltsch (Switzerland) and David Mumford (USA) contributed to the work of the Committee as the DML liaison committee of the IMU.

APPENDIX: THE CEIC'S TERMS OF REFERENCE

At its 71st session on August 19, 2006, in Santiago de Compostella the IMU Executive Committee has reviewed the activities of its *Committee on Electronic Information and Communication* (CEIC) and has decided to re-establish the CEIC for a third term with the following revised terms of reference.

COMMENT: This is the not yet finally revised version, mildly revised by me.

Terms of Reference:

As an international steward of mathematical science, the IMU has accepted a responsibility to advance the use of new technologies. It has therefore established the CEIC to advise it on how best to accomplish that goal.

- (1) The CEIC's duties are to
 - (a) Review the development of Electronic Information, Communication, Publication, and Archiving as it impacts the international mathematical community with the aim to make the issues involved generally understood, to define the relevant needs of our discipline clearly.
 - (b) Encourage electronic mathematical community building and to contribute to the development of tools for this purpose.
 - (c) Review and sponsor activities for mathematical software and data repositories.
 - (d) Coordinate and facilitate collaboration among stakeholders in these and related activities for the benefit of mathematics worldwide.
 - (e) Report regularly to the EC, and to advise and alert the EC to new developments.
 - (f) Advise the EC on electronic aspects of IMU operations, including financing requirements.
 - (g) Suggest further actions as necessary.
- (2) The CEIC is a standing committee of the Executive Committee (EC) of the IMU, reviewed every four years by the EC at its meeting preceding that of the GA. Members are appointed in even numbered years for staggered four year terms using criteria similar to those for IMU Commissions. The CEIC conducts most of its work electronically, meeting face to face as necessary.
- (3) The CEIC is asked to address, in its third 4-year term, the following issues with special emphasis.
 - (a) The CEIC is asked to facilitate and encourage the development of a Digital Mathematics Library.

- (b) The CEIC may suggest international standards ('best practice recommendations') on issues related to publication and electronic communication. Such recommendations will be reviewed by the EC and, if approved, may be published and promoted in the name of the IMU.

The CEIC is expected to continue its previous efforts, such as its once promotion and organization of Math-Net and its current promotion of the Federated World Directory of Mathematicians, that make mathematics-related material electronically available.

The CEIC may organize or sponsor international meetings or forums to bring together representatives of all interested parties.