

THE DIGITAL MATHEMATICAL LIBRARY PROJECT

STATUS AUGUST 2005

WHAT IS THIS PROJECT?

Vision for the World Digital Mathematical Library (WDML)

The large goal of the WDML project is to make the vast corpus of past mathematical research dramatically more accessible, alike in the great centers and far away from fine libraries, to mathematicians and scientists and engineers worldwide through the internet. The mechanism proposed is to give free access to retro-digitized back files of journals, together with sophisticated reference linking that would allow traversal of the literature. This reference linking is seen as key, not only to the usability of the system but also to convincing publishers to participate: it will greatly increase the value of their current journals to make each a gateway to all the past journals.

EVOLUTION OF THE VISION OF A WDML: A CHRONOLOGY

Presented by Keith Dennis and Philippe Tondeur at the Joint Mathematics Meeting, San Diego, California, January 2002, with contributions by many participants, in particular John Ewing, Executive Director of the AMS; updated: Brussels, Belgium, March 26, 2002; in connection with a visit by Philippe Tondeur with M. Philippe Busquin, EC Commissioner for Research, Rolf Jeltsch, President of the European Mathematical Society, and Luc Lemaire, Vice-President of the European Mathematical Society; and further updated October 2003, August 2004, and April 2005 at workshops and meetings with international participation concerning this project.

We propose a project which can be realized by the international cooperation of research organizations around the world. It is the creation of a world digital (virtual) mathematics library (WDML) of the scholarly literature legacy in the mathematical sciences as part of the fundamental world infrastructure for the mathematical sciences and related fields. The realization of this project will have a significant impact on the way mathematics is done and used in the 21st Century. If we are successful with this project, its future impact on mathematics, the sciences, and education could be the most significant event since the invention of scholarly journals as a replacement for the private correspondence of individual scientists. It could also serve as a prototype for a new model of scientific cooperation, a new paradigm for the future of science in our electronically connected world. If realized, it will strengthen the publication of current journals, by making each a gateway to all the past journals.

This is an updated version of the dream of the Alexandrine Library. The project is of a distributed system, sustained by the existing University Library System of the world, with access to users following established current practices.

REALIZATION

We see three phases to the realization of this project: a design phase, an implementation phase, followed by an indefinitely sustained operation phase.

Design Phase.

The task is to set technical standards for making the scholarly mathematical literature accessible online, and to negotiate a protocol for making future mathematical literature similarly available. The design team should be an international consortium from the profession and interested parties - to be supported by planning grants from various research organizations. Issues to be addressed include content, format, copyright, and archiving (see below).

Implementation Phase.

The implementation phase or “construction phase” is a massive digitization project of the existing scholarly mathematical sciences literature. It is to be conceived as a distributed system mirrored on many servers around the world. This is a significant capital project of the order of U.S. \$100M, to be carried out as an international collective effort of Science Research organizations around the world.

Sustained Operation in the Long Term.

This is an essential aspect of this project, to make it part of the world’s scientific infrastructure. This is a function expected to be assumed by the system of University Libraries around the world. Critical ingredients are web connections and site licenses for access.

ESSENTIAL ASPECTS FOR THE SUCCESS OF THIS PROJECT:

- Competition and cooperation need to be effectively balanced.
- Internationality
- Sustainability

This project was approved by the Committee on Electronic Information Communication (CEIC) of the International Mathematical Union (IMU) at its February 15-17, 2002 meeting in Vancouver:

http://www.ceic.math.ca/Publications/Minutes/5th_Minutes.pdf

The Design Phase began July 2002 in a meeting at NSF organized by Cornell University, under the leadership of Keith Dennis (dennis@math.cornell.edu), Jean Poland and Sarah Thomas. It was funded by the following planning grant from the U.S. National Science Foundation.

NSF Award Number: DUE-0206640

[\[DML Home\]](#)

Digital Mathematics Library – NSF Planning Grant

Steering Committee for this Planning Grant

Keith Dennis	Cornell	dennis@rkd.math.cornell.edu
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Hans Becker	Göttingen	becker@mail.sub.uni-goettingen.de
Pierre Bérard	Grenoble / NUMDAM	Pierre.Berard@ujf-grenoble.fr
Bernd Wegner	TU Berlin / Zentralblatt	wegner@math.tu-berlin.de

At this meeting, the following organizational structure was established:

IMU Liaison Committee

Rolf Jeltsch	EMS / ETH Zurich	jeltsch@math.ethz.ch
David Mumford	Brown	David_Mumford@brown.edu

Working Groups

Content

Co-chairs:

Keith Dennis	Cornell	dennis@rkd.math.cornell.edu
Bernd Wegner	TU Berlin / Zentralblatt	wegner@math.tu-berlin.de

Member:

Steve Rockey	Cornell	swr1@cornell.edu
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Technical Standards

Co-chairs:

Thierry Bouche	Grenoble / NUMDAM	thierry.bouche@ujf-grenoble.fr
Ulf Rehmann	Bielefeld	rehmann@mathematik.uni-bielefeld.de

Metadata

Co-chairs:

Tim Cole	Illinois	t-cole3@uiuc.edu
Heike Neuroth	Göttingen	neuroth@mail.sub.uni-goettingen.de

Member:

Robbie Robson	Eduworks Corporation	robson@eduworks.com
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Rights and Licenses

Co-chairs:

Pierre Bérard	Grenoble / NUMDAM	Pierre.Berard@ujf-grenoble.fr
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Archiving

Co-chairs:

Hans Becker	Göttingen	becker@mail.sub.uni-goettingen.de
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Economic Model

Chair:

James Crowley SIAM jcrowley@siam.org

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Jonathan
Borwein Simon Fraser U jborwein@cecm.sfu.ca

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John Ewing AMS jhe@math.ams.org

David Tranah Cambridge UP dtranah@cambridge.org

WHAT IS THE CURRENT STATUS OF THE PROJECT? (AUGUST 2005)

Below are listed some items in approximate chronological order through 2003-2005.

There is a detailed description of the further activities of the Cornell University Library planning group at:

<http://www.library.corne/dmlib/index.html>

They organized a series of meetings in January, March and May 2003. The DML working groups described above produced the following reports.

Content:

<http://www.library.cornell.edu/dmlib/dml-content-2003oct.html>

Technical Standards:

http://www.mathematik.uni-bielefeld.de/%7Erehmann/DML/dml_standards_fin.pdf

Metadata:

<http://www.library.cornell.edu/dmlib/dml-metadata-2003aug4.pdf>

Rights and Licenses:

<http://www.library.cornell.edu/dmlib/dml-copyright-2002dec28.pdf>

Archiving:

<http://www.library.cornell.edu/dmlib/dml-archiving-2003mar14.pdf>

Economic Model:

<http://www.library.cornell.edu/dmlib/dml-econmodel-2003jan12.pdf>

Addendum to Economic Model:

<http://www.library.cornell.edu/dmlib/dml-econaddendum-2003Aug6.pdf>

The Cornell University Library published its final report to NSF at

http://www.library.cornell.edu//dmlib/DMLreport_final.pdf

The distributed DML projects on journals and books are listed at

<http://www.ceic.math.ca/WDML/dml/index.shtml>

A report orienting on the status of the project in late summer 2003 as well as a listing of then ongoing retro-digitisation projects is the following reference:

The Digital Mathematics Library.

Allyn Jackson, Notices of the AMS, September 2003, pages 918-923.

<http://www.ams.org/notices/200308/comm-jackson.pdf>

The International Mathematical Union (IMU), resp. its Committee on Electronic Information and Communication (CEIC) assumed May 2003 the responsibility for the next phase of the newly named WDML project. The initial DML planning group and the DML working groups disbanded.

A Steering Committee for the WDML was formed in July 2003, consisting of:

Alf van der Poorten, Macquarie University, Sydney (Chair)
Pierre Berard, U of Grenoble
Thierry Bouche, U of Grenoble
Gertraud Griepke, Springer Verlag
Rolf Jeltsch, ETH
David Mumford, Brown U
Jean Poland, Cornell U Library
Bernd Wegner, Zentralblatt and TU Berlin

The CEIC discusses four essential components of any such digitization project in a frequently updated draft. The latest version is Draft 5.3, dated March 24, 2005 at http://www.ceic.math.ca/Publications/dml_vision.pdf

From July 25 to 27, 2004, there was a 3rd International Meeting of the WDML, held in Stockholm. The participants reported on “New Developments in Electronic Publishing of Mathematics”. Comments on this workshop are posted (see the item IMU on the Web #3) at <http://www.ceic.math.ca/News/IMUonWeb.html>

A workshop on the WDML was held at the Mathematical Sciences Research Institute in Berkeley from April 15 to 17, 2005. The purpose was to learn best practices from digitization projects underway, to build a consensus on standards and features, and develop arguments with which to convince publishers to participate. Workshop participants included the representatives of many ongoing digitization projects, as well as most members of the CEIC Steering Committee listed above. The presentations are posted at <http://www.msri.org/dmlp>

REFERENCES ON THE DML (in reverse chronological order)

Materials from the conference on the Digital Mathematical Library project, held April 15-17, 2005 at MSRI, Berkeley

<http://www.msri.org/dmlp>

Comments on a workshop entitled “New Developments in Electronic Publishing of Mathematics”, held July 25 to 27, 2004, in Stockholm (also the 3rd International Meeting of the WDML). These comments are posted (see the item IMU on the Web #3) at:

<http://www.ceic.math.ca/News/IMUonWeb.html>

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http://www.ceic.math.ca/Publications/dml_vision.pdf

Digital Mathematical Library

A planning project.

Sarah Thomas, Jean Poland, Keith Dennis, Cornell U Library.

<http://www.library.cornell.edu/dmlib/index.html>

Digital Mathematical Library Final Report at:

http://www.library.cornell.edu/dmlib/DMLreport_final.pdf

Several references for the Digital Mathematical Library are listed at

<http://www.Mathematik.uni-bielefeld.de/~rehmann/DML/>

The Digital Mathematics Library.

Allyn Jackson, Notices of the AMS, September 2003, pages 918-923.

<http://www.ams.org/notices/200308/comm-jackson.pdf>

Digital Mathematical Library: Moving Forward

John Ewing (Executive Director, AMS)

Following the discussion at the Baltimore

Joint Meeting, January 2003:

<http://www.ams.org/ewing/dml-moving-forward.pdf>

Twenty Century of Mathematics:
Digitizing and Disseminating the Past Mathematical Literature.
John Ewing, A 2001 white paper on the subject.
Notices, August 2002, pages 771-777.
<http://www.ams.org/ewing/>

Best Current Practices:
Recommendations from the IMU Committee on Electronic Information
Communication (CEIC), February 2002.
John Ewing
<http://www.ams.org/ewing/>

P.S. This WDML Status August 2005 document is accessible under Digital Mathematical
Library at
<http://www.math.uiuc.edu/~tondeur>