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# La Villette in Paris to Be Site of ICIAM '87

*Adapted from material prepared for* SIAM News *by the staff of the Cité des Sciences et de l'Industrie*

The Cité des Sciences et de l'Industrie in Paris, France's new national science and technology museum, will be the site of the First International Conference on Industrial and Applied Mathematics, June 29 to July 3, 1987. Located in La Villette, a sprawling complex in northeastern Paris, the Cité is a short walking distance from the Porte de la Villette subway stop, which is just 20 minutes by subway from the Arc de Triomphe de l'Etoile.

Located in the city's largest park, which is crossed by two picturesque canals, La Villette was conceived as a stimulating environment and meeting place for the arts and sciences. In addition to the Cité, the complex comprises the 19th-century Grande Halle, a newly renovated, multipurpose exhibition hall. In the future the complex will also include a large music center, scheduled to be the home of the Paris Conservatory. When completed, the park will be studded with cafés, restaurants, gardens, and sports facilities, along with the Zénith, a theater that has been the site of rock concerts since 1984.

With ultramodern facilities and state-of-the-art museum technology, the Cité portrays the achievements and potential of science and industry. Carefully wrought exhibits and participative, hands-on displays make discovery of the wonders of science an exciting, personal experience. The Cité places science and industry in a broad context, using multidisciplinary exhibits to focus on the far-reaching implications of science for the environment, society, and daily life. To facilitate understanding and eliminate the need for previous knowledge, everyday examples are used extensively as starting points to illustrate fundamental scientific laws and concepts.

At the inception of the project in 1979, Maurice Lévy, president of the museum, was given a mandate by the French government to create a national science museum for the generations of today and tomorrow. Lévy gave priority to new interactive exhibit methods and advanced museum technology. At the same time, he felt that attention should be directed to two key contemporary issues—the social impact of science and industry and the need for everyone to make active decisions about the role of science and technology in their lives. This innovative approach has shaped the Cité as it now stands. Combined with its size, which greatly exceeds that of the world's leading science museums, and its unique setting, this factor makes the Cité truly a museum for the 21st century.

Together, these features contribute to

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The Geode, one of the Cité's theaters

If you are planning to attend ICIAM '87, you should have received by now the preliminary program, which includes registration and travel information and registration forms. Anyone who has not received this material can obtain it from SIAM at (215) 564-2929 or, by electronic mail, SIAM-@WHARTON-10.ARPA.

See the advertisement on page 19 for further information about ICIAM '87.

# Math Sciences Education Board Forging Ambitious Program

**By Alex Kozlov**

The reports are all in, and the news is bleak: When it comes to mathematical skills, American students are by no means standing tall. The inadequacy of U.S. primary and secondary education is most starkly revealed in international comparisons of students from industrialized countries, where Americans—especially once they reach high school—consistently rank toward the bottom of the table.

What brought about this state of affairs? Boring and repetitious curriculum, low expectations, and negative attitudes have been identified as leading culprits.

It took considerable time and effort just to identify these problems. Now comes the hard part—figuring out how to solve them. Charged with that task is the Mathematical Sciences Education Board (MSEB), established in October 1985 by the National Research Council (NRC). The 34-member board includes academics in mathematics and education, as well as elementary and high school teachers and administrators, along with representatives of business, industry, school boards, and parent–teacher organizations.

According to an NRC statement, "A principal goal [of MSEB] will be to identify mathematical skills needed by students preparing to work at all levels of an information-intensive, high-technology society. . . . [MSEB] will not only make recommendations on how to strengthen mathematics education in the United States, but will work with federal, state, and local agencies and business and industry to help implement improvements." To work toward these ambitious aims, MSEB has, since its establishment, met four times, most recently in March. The meetings have amounted to, in effect, a series of collective deep breaths, a start toward plotting a course-map for the long, difficult road ahead.

And a long road it will be. According to a February draft report, MSEB hopes to develop "an agenda for reinvigoration [of the mathematical sciences] immediately and renewal by the year 2000." Accustomed as we are to quick results, 13 years seems like an awfully long time to wait. But according to Anthony Ralston, a professor of computer science and mathematics at the State University of New York–Buffalo and chair of MSEB's Curriculum Task Force, "Thirteen years is not very long considering the kinds of changes we are talking about." Shirley Hill, a professor of mathematics and education at the University of Missouri–Kansas City and chair of MSEB, adds that "one of the real strengths of this board *is* its ability to look ahead, to think in the long term."

Meanwhile, MSEB is heavily involved in reinvigoration efforts, working cooperatively with virtually every major player on the mathematics education scene—from the professional mathematical science societies and the American Association for the Advancement of Science, to state education agencies, the national PTA, and the children's television workshops. Three national conferences have been held, one at the National Academy of Sciences, on international comparisons of student achievement in mathematics, and two at UCLA, covering directions of curricular reform and the impact of testing on what goes on in the classroom. A series of state and regional conferences has been launched, with the first held in Pennsylvania last year and the second coming up in Minnesota this May.

Major goals of the reinvigoration effort include raising expectations, changing the image of mathematics as static and dull, and paving the way for the dramatic changes to come. Perhaps the most important step in paving the way will come in the spring of 1989, with publication of standards for school mathematics. These standards, to be recommended to states and localities, will cover curriculum, instruction, and evaluation and are being developed in a joint context with the National Council of Teachers of Mathematics. They will form what MSEB Executive Director Marcia Sward called "our launching pad—the base from which we can help school systems make the significant changes necessary for the next century."

A recent MSEB statement describes the organization as "designed to grow into the most comprehensive and far-reaching national leadership effort in mathematics education ever to be undertaken in the U.S."

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## What's Inside



# New SIAM Journals to Focus on Discrete Math and Matrix Analysis

In 1978, the SIAM Council and Board of Trustees approved plans to publish a SIAM journal on algebraic and discrete methods. In so doing, they recognized the substantial developments that had occurred in the application of combinatorics, graph theory, and linear algebra to communications, systems, and the management and decision-making areas. Problems in these areas had been creating new mathematical challenges and new channels by which mathematics had a direct impact on real-world problems. The introduction of the new journal would establish a SIAM commitment to attract good papers and to support applied mathematicians working in the applicable areas of combinatorics, graph theory, and linear algebra. The first issue of *SIAM Journal on Algebraic and Discrete Methods* was published in March 1980.

SIAM's governing bodies have now given approval to replace that journal by two new journals—*SIAM Journal on Discrete Mathematics* and *SIAM Journal on Matrix Analysis and Applications*. The first issues of the new journals will be published in the first quarter of 1988. The last issue of *SIAM Journal on Algebraic and Discrete Methods* will appear in October 1987.

"The decision to introduce the new journals was based largely on the increasing interest in linear algebra and discrete mathematics among SIAM members," said C. William Gear, SIAM president. Since 1980, the successive managing editors of *SIAM Journal on Algebraic and Discrete Mathematics*—Daniel J. Kleitman, Carl D. Meyer, Jr., and Charles R. Johnson—have developed important links between SIAM and the communities addressed by the journal and attracted the work of important researchers, according to Gear.

During the same period, SIAM established two activity groups, one on linear algebra and the other on discrete mathematics. Each of these groups has organized several well-attended conferences. Other conferences are now being organized, one in Madison in May 1988, on linear algebra and applications, and another in San Francisco in June 1988, on discrete mathematics. Gear said: "The decision to introduce SIAM journals in these areas was a natural step to take."

**SIAM's New Journal in Linear Algebra**

"*SIAM Journal on Matrix Analysis and Applications* will focus on matrix theory and applications in such areas as Markov chains, networks, signal processing, systems and control theory, mathematical programming, economic and biological modeling, and statistics and operations research," according to Robert E. O'Malley, Jr., SIAM vice president for publications and professor of mathematical sciences at Rensselaer Polytechnic Institute. "It will also include numerical matrix methods to the extent that they are relevant in these areas."

Gene H. Golub, professor of computer science at Stanford University and past president of SIAM, will be managing editor of the new journal. He is the founding editor of *SIAM Journal on Scientific and Statistical Computing*. Robert J. Plemmons, professor of mathematics at North Carolina State University, will be associate managing editor of the new journal.

*Continued on page 15*

## GOING TO ICIAM '87?

**–It will be a world event–**

More than 1,500 people from 60 countries are expected to attend the second International Conference on Industrial and Applied Mathematics, on June 29–July 3, 1987, at La Villette in Paris.

Travel agencies have been selected by INRIA (the conference organizer) to help you make your travel arrangements. *The main agency is:*

Techno-Congress
10 Rue de L'Isly
75008 Paris, France
Tel: 33.1.42.93.67.70
Telex: 281398 (Aerovoy)

The following travel agencies have also been appointed:

*For the United States and Canada:*

Travel Unlimited
8500 Wilshire Blvd., Suite 528
Beverly Hills, CA 90211
Tel: 213-657-2721, 213-655-4252, or 213-655-4262
Telex: 4950136

*For Japan:*

France Travel Center
French Bank Bldg.
1-2 Akasaka 1-Chome, Minato-Ku
Tokyo 107, Japan
Tel: 81-3-582-4251 or 81-3-582-4777
Telex: 2424566

*For Brazil (and South America):*

M.L. Turismo
Rua Gomez Carneiro
134-Ipanema
Rio de Janeiro
Tel: 55-21-267-4688
Telex: 215017 (MJSL)

Details about the conference including program details, registration information, and hotel accommodations, will be available in late February. The conference is being sponsored by GAMM, IMA, SIAM, and SMAI. INRIA has responsibility for conference organization:

INRIA
Service des Relations Exterieures
Bureau de Colloques
Domaine de Voluceau
BP 105-78153 LE CHESNAY Cedex
FRANCE
Tel: 33.1.39.63.56.00
Telex: 697 033 F

For information about conference exhibits, write to:

Jean Claude
Rault
B.P. 45
92193 Meudon Cedex
FRANCE
Tel: 33.1.40.26.4528

Any questions? In the United States and Canada, contact SIAM. Elsewhere, write or call INRIA, c/o Service des Relations Exterieures.

# On the Eve of ICIAM '87

Four international societies of applied mathematicians—die Gesellschaft für Angewandte Mathematik und Mechanik (GAMM) of the German-speaking countries, the Institute of Mathematics and Its Applications (IMA) of the United Kingdom, the Society for Industrial and Applied Mathematics (SIAM) of the United States, and la Société de Mathématiques Appliquées et Industrielles (SMAI) of France—will join forces in Paris from June 29 to July 3, 1987, to conduct the First International Conference on Industrial and Applied Mathematics. The conference, called ICIAM '87, will be hosted by SMAI.

Applied mathematics is a very old subject. Research in applied mathematics received great impetus during and immediately following World War II, when there were major advances in mathematical methodologies and their applications to problems of government and industry.

Since that period, research results in applied mathematics, including the numerical mathematics and algorithm developments that have evolved with the large-scale high-performance scientific computers, have triggered new interest in the use of mathematics and computers to solve real-world problems. In the process, computational mathematics has appeared as a major subfield of applied mathematics.

Many mathematicians are shifting their attention to problems of an applied character. Applied mathematics programs, distinct from those in classical mathematics, are appearing in the universities. Educators are asking how mathematical applications should be introduced into the curriculum to increase mathematical literacy. Publishers are seeking authors for books on applied mathematics. Many industrial organizations now have formal groups that include mathematicians for engineering and scientific analysis. In the United States, there have been new initiatives by government agencies to support applied mathematics research.

More than 1,000 applied mathematicians from more than 50 countries are expected to present papers at ICIAM '87 on topics ranging from vorticity, chaos, dynamical systems, robotics, and control to optimization, parallel processing, multigrid methods, algorithm development, stochastic modeling, lattices, and networking. In addition to the 16 invited speakers from seven countries, there will be more than 60 minisymposia, many of which in themselves have speakers from two or three countries. More than 1,500 attendees are expected. The response demonstrates the worldwide interest in applied mathematics and in an international forum.

ICIAM '87 will herald a new era of opportunity for applied mathematicians, possibly more opportunity than ever before, to develop useful mathematics and to solve problems of the real world. The challenge is at hand. It is a matter for the mathematical community to respond. And if all goes well, there will be a second international conference on industrial and applied mathematics in 1991, if not sooner.—*IEB*

# SIAM Meetings, Conferences, Workshops, and Short Courses

## 1987

**June 29–July 3, 1987**

**First International Conference on Industrial and Applied Mathematics**
**Paris, France**

Cosponsored by GAMM, IMA, SIAM, and SMAI

**July 20–24, 1987**

**SIAM Conference on Applied Geometry: Modeling, Robotics, Computational Geometry, Computer Vision, and Tiling**
**Hilton Hotel, Albany, NY**

With the cosponsorship of Rensselaer Polytechnic Institute

Topics include: Free-form modeling with cubic algebraic surfaces, implicitization and parametrization of curves and surfaces, semiparametric algorithms related to robot motions, the generation and uses of aperiodic tilings, computer modeling and simulation, solid modeling and manufacturing applications, subdivision algorithms for curves and surfaces, geometric approaches to computational problems, the application of geometric reasoning to vision and robotics.

Minisymposia include: Motion planning, algebraic geometry in geometric modeling, blending surfaces, geometric processing, non-tensor product surfaces, geometric continuity, tolerancing, shape control in surface design, mesh generation, algebraic methods in geometry, parallel methods in geometry, visual multi-dimensional geometry with applications, probabilistic approaches to computer-aided geometric design, computational geometry, data reduction for splines and its applications, and digital geometry.

*Chair:* Harry McLaughlin, Rensselaer Polytechnic Institute

**Plus a one-day Short Course on Uses of Surfaces in Industry: Geometric Modeling, Machine Vision and Motion Planning (July 19)**

*Short Course organizer:* Ramon F. Sarraga, General Motors Research Laboratories

**October 12–15, 1987**

**SIAM 1987 Annual Meeting and 35th Anniversary**
**Marriott Hotel-City Center**
**Denver, CO**

This will be the only SIAM annual meeting in 1987. The meeting will feature invited talks on inverse scattering, theoretical seismology, ecosystem models, hypersonic aerodynamics, liquid crystal theory, polymer crystals, discrete methods, and robust control theory. The Polya Prize lecture and The John von Neumann lecture will also be given. Minisymposia will cover topics in sparse matrix computation on vector and parallel computers, inverse scattering, robust control theory, compressible fluid computations, network routing parallel algorithms, solitons, robotics, parallel and distributed computation, domain decomposition, multigrid methods, finite element techniques, and dense matrix computation on vector and parallel computers

*Chair:* Hans F. Weinberger, University of Minnesota

**Plus a one-day Short Course on Parallel Computation**

*Short Course organizer:* Lloyd Fosdick, University of Colorado, Boulder

**December 1–4, 1987**

**Third SIAM Conference on Parallel Processing for Scientific Computing**
**Westin Bonaventure Hotel, Los Angeles, CA**

Sponsored by the SIAM Activity Group on Supercomputing

Conference themes: High-speed computer architectures, numerical linear algebra, computer performance evaluation, computational complexity, distributed computing, adaptive numerical methods, numerical domain decomposition methods, scientific programming languages, high-speed computer environments, and numerical particle methods.

*Chair:* Garry H. Rodrigue, Lawrence Livermore National Laboratory and University of California, Davis.

## 1988

**May 23–26, 1988**

**Third SIAM Conference on Applied Linear Algebra**
**Madison, WI**

Sponsored by the SIAM Activity Group on Linear Algebra.

*Chairs:* Richard Brualdi and Hans Schneider, University of Wisconsin, Madison

**June 13–16, 1988**

**Fourth SIAM Conference on Discrete Mathematics**
**San Francisco, CA**

Sponsored by the SIAM Activity Group on Discrete Mathematics

*Chair:* Maria Klawe, IBM Almaden Research Center

**July 11–15, 1988**

**SIAM Annual Meeting**
**Hyatt Regency**
**Minneapolis, MN**

*Chair:* Donald Saari, Northwestern University

## 1989

**July 17–21, 1989**

**SIAM Annual Meeting**

### REPLY FORM

Detach and mail to: SIAM Conference Coordinator, Suite 1400, Architects Building, 117 S. 17th Street, Philadelphia, PA 19103-5052, or phone (215) 564-2929.

**Please send me information on the following:**

**1987**

| | |
|---|---|
| First International Conference on Industrial and Applied Mathematics, Paris, France<br>June 29–July 3, 1987 | ☐ Program/Registration Material |
| SIAM Conference on Applied Geometry: Modeling, Robotics, Computational Geometry, Computer Vision, and Tiling<br>July 20–24, 1987 | ☐ Program/Registration material<br>☐ Information on Short Course |
| SIAM Annual Meeting<br>October 12–15, 1987 | ☐ Abstract form for a contributed or poster presentation<br>☐ Minisymposium proposal form<br>☐ Program/Registration material<br>☐ Information on Short Course |
| SIAM Conference on Parallel Processing for Scientific Computing<br>December 1–4, 1987 | ☐ Abstract form for a contributed or poster presentation<br>☐ Program Registration material |

**1988**

| | |
|---|---|
| Third SIAM Conference on Applied Linear Algebra<br>May 23–26, 1988 | ☐ Abstract form for a contributed or poster presentation<br>☐ Minisymposium proposal form<br>☐ Program/Registration material |
| Fourth SIAM Conference on Discrete Mathematics<br>June 13–16, 1988 | ☐ Abstract form for a contributed or poster presentation<br>☐ Minisymposium proposal form<br>☐ Program/Registration material |
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5/87

NAME

TITLE DEPARTMENT

ORGANIZATION AREA CODE/PHONE NUMBER

ADDRESS

CITY STATE ZIP CODE

## French Museum Preparing to Host ICIAM '87,

*continued from page 1*

the success of the Cité in bringing science to the community at large. As an open museum dedicated to providing a better understanding of the achievements and potential of science and industry as well as their place in a changing society, the Cité is a forerunner of a new generation of science museums.

### A New Perspective on Science

To facilitate understanding of often complex scientific achievements and their potential, the permanent exhibitions are divided into broad, interrelated subject areas—"From Earth to Universe," "The Adventure of Life," "Matter and the Work of Man," and "Language and Communication"—rather than narrow disciplines. Among the issues addressed by these permanent exhibitions are the relationship of humans with the physical environment, their place in society, and the ways in which they communicate with one another.

The emphasis on the environment—physical, biological, and social—brings the often unforeseen impact of science and industry on humans into clear focus. Ultimately, the way science is used determines its social consequences. Accordingly, while portraying the accomplishments and capabilities of science and industry, the museum also emphasizes for visitors the need to make informed decisions about the role of technology in their lives.

Above all, the Cité is a place to learn and to have fun. The use of new teaching tools and the latest in museum technology contribute greatly to the museum's ability to achieve these goals. Hands-on exhibits stimulate and challenge both children and adults in their personal discovery of science. Automatons, robots, space stations, and merry-go-rounds contribute to the experience.

A myriad of computer-based displays and games is offered, and visitors are encouraged to participate. Interactive audio-visual presentations involve people of all ages, while videodisks and other mass-storage systems provide large volumes of information and images to answer questions and illustrate the learning process.

### The Key Role of Industry

The achievements of industry and the essential role played by industry in modern life are highlighted throughout the Cité. Industry has cosponsored many of the Cité's exhibitions.

In the industrial exhibition area, exhibitions change every six months. Companies are invited to showcase their work and achievements, including new products, new technologies, and training programs. "Viewing Industry in 3D" is a fascinating portrayal of techniques and technologies developed by various industries.

The "Science Newsroom" uses multimedia techniques to explain and comment on key scientific events for a general audience. Companies are invited to take advantage of this facility and the presence of invited journalists to present new achievements, breakthroughs, and developments in their fields.

### Space Age Theaters

The Cité has two theaters for the presentation of science-related subjects. Spectators attending presentations in the Geode, a hemispherical structure located on the south side of the main building, are surroundeded by 180-degree images and immersed in six-track stereo sound. The images projected on the screen offer unsurpassed clarity and impact, with special effects added by lasers and holograms.

In the Planetarium, one of the focal points of the Cité, visitors discover the wonders of outer space. Images from observatories and space missions are used extensively, along with multimedia projectors.

### Serving the Community

The Cité serves a wide range of community needs. Designed to bring scientific knowledge and exhibits to the four corners of France, it caters not only to the general public but also to the special requirements of young visitors, scientists, and clubs.

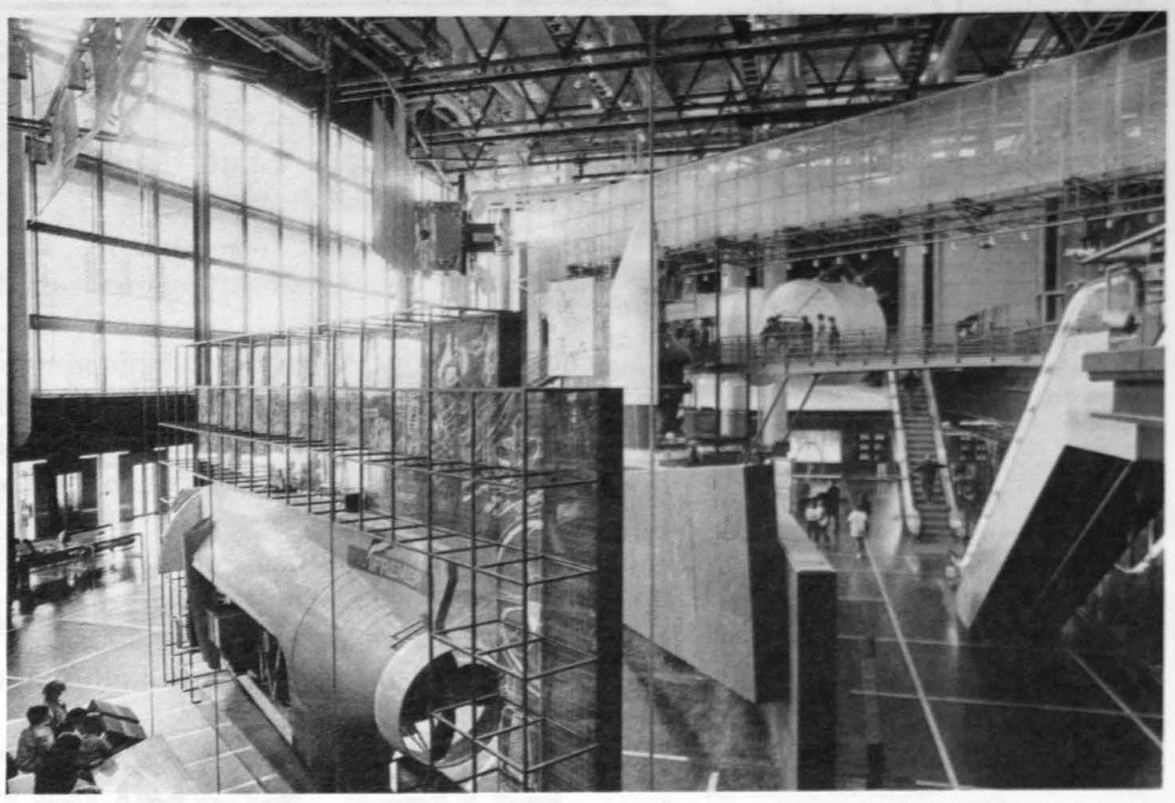
The "Inventorium" was specially designed to make children's first contacts with the museum both exciting and enjoyable. Divided into two sections by age group, the Inventorium features discovery rooms as well as child-oriented exhibits, games, and workshops. Throughout, children are encouraged to touch, observe, play, and participate.

Educational programs are another important element of the museum's activities, and two-week visits to the Cité are organized on a regular basis. Students from 8 to 16 years of age, accompanied by their teachers, spend the period visiting the exhibits and facilities at La Villette.

The multimedia library at the Cité is one of the most modern of its kind anywhere. Using the latest computer-based technology, it is one of France's major resources for scientific and technical information. A computerized catalog and a revolutionary information-delivery system provide rapid access to the library's materials, whether in printed, audio, or visual form. A "videotex" service that is open to the public provides access to the library's catalog for users throughout France. A special section of the library will be open to researchers and will ultimately house 800,000 volumes on the history of science and technology, the dissemination of scientific information, the teaching of the sciences, and scientific and technical museology.

The industrial resources center serves as a source for information on French industry and companies.

Finally, the museum's regional center provides meeting rooms and exhibition materials for clubs and groups throughout France, enabling them to organize exhibitions in their own regions.



Exhibits at the Cité: space *(background)* and the ocean *(foreground)* as the outer limits of the environment.