NOTES ON NOTIONS AROUND
OPERATIONAL RESEARCH

C.B. Tilanus

Report ARW 03 THE BDK/ORS/85/04

Preliminary and confidential
Eindhoven University of Technology
Eindhoven, Netherlands
April 1985
NOTES ON NOTIONS AROUND OPERATIONAL RESEARCH

C.B. Tilanus, Eindhoven University of Technology, Eindhoven, Netherlands

Abstract

In order to get a better grasp of the importance of notions adjacent to, or overlapping with, Operational Research, British, American and international organizations and university education programs are surveyed using a list of ten key concepts. It appears that professional organizations, of engineers, etc., are more nationally oriented, whereas scientific organizations are more internationally oriented. Further evidence is obtained that "nature and the real world are not organized as science and the universities are".

Contents

1. Introduction 3
2. Organization 4
3. Education 8
4. Conclusions 11
Acknowledgment 12
References 12
Appendix 1. British Associations 14
Appendix 2. National Organizations of the U.S. 16
Appendix 3. International Organizations 26
Appendix 4. Strong to very strong American graduate programs in Operations Research and Industrial Engineering 30

This study was commissioned by North-Holland Publishing Company.
1. Introduction

An investigation was made of existing associations and university programs in operational research and related fields. The search was limited to English-speaking, British, American and international institutions. The following list of key concepts was used: (1) operations/operational research, (2) management science, (3) industrial engineering, (4) systems analysis, (5) decision science, (6) cybernetics, (7) automatic control, (8) information processing, (9) econometrics, (10) scientific management.

The meaning of the key concepts was taken for granted. Not only because all of them have a given image, but also because a name and, likewise, a definition may be more an intention than a reality. Hall [5, 6] revealed this phenomenon for the management sciences.

Scientific and professional fields resemble firms in several respects. Their size distribution is skew; they flourish or dwindle; they attract or lose people; they conquer and merge, or separate and start from scratch; true to the theory of monopolistic competition, they dissimulate their similarities and differentiate their products. For instance, Ackoff in his famous twin articles on the future of OR [1, 2] tells us that he called the subject of his new graduate program: "Social Systems Sciences" or S3, because he could not conceive of a profession, a discipline or a society using such an awkward name, and wanted to preclude such use.

Questions raised are:
- What are the "market shares" of operational research and related fields?
- Are there differences between the scientific, academic world and the "real world" of business and industry?
- What is the relation between generalistic, interdisciplinary, main fields and specialistic, monodisciplinary, subfields?

First, attention is focused on organizations in Britain, in the U.S., and international (Section 2). Next, university educational programs are reviewed (Section 3). Some questions are answered in the conclusions (Section 4).
2. Organization

The prime sources were the Directory of British Associations [7], the Encyclopedia of Associations—a guide to U.S. national and international organizations [15], and the Yearbook of International Organizations [14]. The associations and other organizations found of interest are compiled in Appendixes 1, 2 and 3.

The British directory [7] lacked an index; the keywords that were applied tracked down only two associations from the alphabetically ordered list (see Appendix 1).

The American guide [15] gives membership figures which may include individuals, firms, institutions, or other associations and should be considered an approximation. Nevertheless, Table 1 indicates the wide range of organizational sizes. Several observations can be made. (Code numbers between brackets refer to [15] and Appendix 2.) By far the largest organizations, are professional societies of engineers and managers (4458, 4793, 4772, 1898, 1921). The Association for Computing Machinery (4728), with its strange name, is the largest of 29 organizations classified under Information Processing (4722-4750). The Econometric Society (5082) is classified under Statistics (5078-5089). The American Society for Cybernetics (4439) does not thrive and the American Institute for Decision Sciences (AIDS) (5281) has come to suffer from the Acquired Immune Deficiency Syndrome. Some specialized associations covering subfields of more general associations are of the same order of magnitude as the latter; examples are the American Production and Inventory Control Society (1899), the Planning Executives Institute (1923), the International Material Management Society (4782), the American Institute of Maintenance (1885) and the Project Management Institute (1925), as compared with the Operations Research Society of America (4883) and The Institute of Management Sciences (1912). The keyword "scientific management", which reminds one of F.W. Taylor and time and motion studies, has been encountered only once, in the former name of the World Council of Management (1905).

The International Yearbook [14] includes the five Sister Federations that are coordinated by the Five International Associations Coordinating Committee (FIACC) (A3893y), see Table 2. (Code numbers refer to [14] and Appendix 3.) The number of countries in which an international association is represented gives only a weak indication of its size and
importance. Nevertheless, it is significant that among the five Sister Federations, IFIP (C1828y) and IFAC (C1862) are represented in 40 or more countries, whereas IFORS (C1966), IMACS (B1174) and IMEKO (C2250) are represented in 33 or less countries. It has been pointed out in [13, Table 10], that IFORS had no members in the communist (or socialist, as they call themselves) countries, whereas the other four Sister Federations were well established in East-Europe. It is worth noting that "Cybernetics" and "Systems" play a greater part on the international scene (C1187, C1778, C4167, C4518, D1797, D5599, F5154, F5730, F5804, G5426), than within Britain and America. On the other hand, the engineering professions are hardly organized internationally (D3924).
<table>
<thead>
<tr>
<th>Code</th>
<th>Organization</th>
<th>Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>4458</td>
<td>Institute of Electrical and Electronics Engineers (IEEE)</td>
<td>180,000</td>
</tr>
<tr>
<td>4793</td>
<td>American Society of Mechanical Engineers (ASME)</td>
<td>80,000</td>
</tr>
<tr>
<td>1898</td>
<td>American Management Associations (AMA)</td>
<td>70,000</td>
</tr>
<tr>
<td>1921</td>
<td>National Management Association (NMA)</td>
<td>60,000</td>
</tr>
<tr>
<td>4772</td>
<td>Society of Manufacturing Engineers (SME)</td>
<td>50,000</td>
</tr>
<tr>
<td>4728</td>
<td>Association for Computing Machinery (ACM)</td>
<td>40,000</td>
</tr>
<tr>
<td>4499</td>
<td>American Institute of Industrial Engineers (AIIE)</td>
<td>31,000</td>
</tr>
<tr>
<td>1899</td>
<td>American Production and Inventory Control Society (APICS)</td>
<td>28,000</td>
</tr>
<tr>
<td>4785</td>
<td>American Mathematical Society (AMS)</td>
<td>18,681</td>
</tr>
<tr>
<td>4791</td>
<td>Mathematical Association of America (MAA)</td>
<td>18,500</td>
</tr>
<tr>
<td>5078</td>
<td>American Statistical Association (ASA)</td>
<td>13,000</td>
</tr>
<tr>
<td>1903</td>
<td>Association for Systems Management (ASM)</td>
<td>10,000</td>
</tr>
<tr>
<td>4883</td>
<td>Operations Research Society of America (ORSA)</td>
<td>7,000</td>
</tr>
<tr>
<td>1912</td>
<td>The Institute of Management Sciences (TIMS)</td>
<td>6,500</td>
</tr>
<tr>
<td>5082</td>
<td>Econometric Society (ES)</td>
<td>6,000</td>
</tr>
<tr>
<td>4765</td>
<td>Society of Logistics Engineers (SOLE)</td>
<td>5,800</td>
</tr>
<tr>
<td>5281</td>
<td>American Institute for Decision Sciences (AIDS)</td>
<td>4,500</td>
</tr>
<tr>
<td>4792</td>
<td>Society for Industrial and Applied Mathematics (SIAM)</td>
<td>4,400</td>
</tr>
<tr>
<td>4723</td>
<td>American Society for Information Science (ASIS)</td>
<td>4,000</td>
</tr>
<tr>
<td>1923</td>
<td>Planning Executives Institute (PEI)</td>
<td>3,700</td>
</tr>
<tr>
<td>4782</td>
<td>International Material Management Society (IMMS)</td>
<td>3,500</td>
</tr>
<tr>
<td>4286</td>
<td>Numerical Control Society (NCS)</td>
<td>3,300</td>
</tr>
<tr>
<td>1885</td>
<td>American Institute of Maintenance (AIM)</td>
<td>2,244</td>
</tr>
<tr>
<td>1925</td>
<td>Project Management Institute (PMI)</td>
<td>2,000</td>
</tr>
<tr>
<td>5098</td>
<td>Society for General Systems Research (SGSR)</td>
<td>1,000</td>
</tr>
<tr>
<td>4439</td>
<td>American Society for Cybernetics (ASC)</td>
<td>200</td>
</tr>
<tr>
<td>4790</td>
<td>Industrial Mathematics Society (IMS)</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: [15]

* Refers to [15] and Appendix 2.
<table>
<thead>
<tr>
<th>Code number*</th>
<th>Organization</th>
<th>Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3893y</td>
<td>Five International Associations Coordinating Committee (FIACC)</td>
<td>5 Sister Federations**</td>
</tr>
<tr>
<td>B1174</td>
<td>International Association for Mathematics and Computers in Simulation (IMACS)</td>
<td>individuals and scientific and industrial institutions in 33 countries</td>
</tr>
<tr>
<td>C1187</td>
<td>International Association for Cybernetics (AIC)</td>
<td>individuals and industrial firms in 42 countries</td>
</tr>
<tr>
<td>C1778</td>
<td>World Organization of General Systems and Cybernetics (WOGSC)</td>
<td>societies in 44 countries</td>
</tr>
<tr>
<td>C1862</td>
<td>International Federation of Automatic Control (IFAC)</td>
<td>scientific or professional engineering organizations in 40 countries</td>
</tr>
<tr>
<td>C1828y</td>
<td>International Federation for Information Processing (IFIP)</td>
<td>societies in 42 countries</td>
</tr>
<tr>
<td>C1966</td>
<td>International Federation of Operational Research Societies (IFORS)</td>
<td>societies in 33 countries</td>
</tr>
<tr>
<td>C2250</td>
<td>International Measurement Confederation (IMEKO)</td>
<td>scientific and technical societies in 27 countries</td>
</tr>
<tr>
<td>C4167</td>
<td>Society for General Systems Research (SGSR)</td>
<td>individuals and institutions in 39 countries</td>
</tr>
<tr>
<td>C4518</td>
<td>International Institute for Applied Systems Analysis (IIASA)</td>
<td>organizations in 17 countries</td>
</tr>
</tbody>
</table>

Source: [14]
* Refers to [14] and Appendix 3.
** These are, in the order as they occur in this table: IMACS, IFAC, IFIP, IFORS, and IMEKO.
3. Education

The prime sources were the handbook of higher education in the United Kingdom [8], Peterson's guides to graduate study in the United States [10, 11], and the Gourman report giving ratings of graduate and professional programs [4]. The list of keywords was also applied to the indexes of three books on management development [3, 9, 12]. Unfortunately, quantitative methods are hardly made explicit in management development programs, as "OR techniques fill the ordinary manager with a fear of mystique or a feeling of inadequacy" [12, p.326].

In the British handbook of higher education [8], among the "Main Subject Headings", one is "Operational Research". From Table 3 we conclude that only operational research, management sciences and econometrics are taught at a significant number of the existing 46 British universities, under the headings of our keywords.

The situation in America is different again. Peterson's guides [e.g., 10, 11] provide information on postbaccalaureate degree programs in 241 academic fields offered by more than 1300 accredited institutions in the U.S. and Canada. "Operations Research" and "Industrial and Management Engineering" figure as academic fields, but the other keywords are not encountered in the list of fields.

To cope with sheer numbers, we turn to the Gourman Report [4]. This gives ratings of graduate programs in 60 distinct academic fields, among whom "Industrial Engineering" and "Operations Research" are distinguished. Table 4 gives the numbers of institutions with scores in the 4.0-5.0 range (strong to very strong) for some of the fields. We conclude that from among our list of keywords, Operations Research and Industrial Engineering are well established in the American academic world. Their ratings are given in Appendix 4.
Table 3. Numbers of British universities teaching key subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>First degrees</th>
<th>Post-graduate courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational research</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Management science(s)/Studies</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Industrial engineering</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Systems analysis</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Decision science</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cybernetics</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Automatic control</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Information processing</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Econometrics</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Scientific management</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: [8]
<table>
<thead>
<tr>
<th>Academic field</th>
<th>Number of institutions with strong to very strong graduate programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer science</td>
<td>51</td>
</tr>
<tr>
<td>Mathematics</td>
<td>48</td>
</tr>
<tr>
<td>Business (MBA)</td>
<td>47</td>
</tr>
<tr>
<td>Economics</td>
<td>46</td>
</tr>
<tr>
<td>Industrial engineering</td>
<td>28</td>
</tr>
<tr>
<td>Statistics</td>
<td>25</td>
</tr>
<tr>
<td>Operations research</td>
<td>14</td>
</tr>
<tr>
<td>Applied mathematics</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: [4]
4. Conclusions

About ten concepts adjacent to, or overlapping with, Operational Research were reviewed. Their expansion was assessed, both in the real world and in academia, both within Britain and the United States, and internationally.

Professional organizations are strong nationally. Within the U.S., there are large associations of engineers, general managers, and more specialized management functionaries like information managers, production and inventory planners, material, maintenance, and project managers.

Scientific organizations are strong internationally. This holds for the five cooperating federations: IFAC, IFIP, IFORS, IMACS and IMEKO, and also for organizations using the words "cybernetics" or "systems" in their names.

University programs in Britain especially recognize Operational Research, Management Sciences and Econometrics. In the U.S., Industrial Engineering and Operations Research are at a level with Statistics and Applied Mathematics.

The importance of these concepts in the world of publishing has not been considered. One may suppose that there is a strong positive correlation between books and journals published in a field and its expansion in academic and scientific institutions. The correlation between publications and professional organizations ought to be weaker.
ACKNOWLEDGMENT

The help is acknowledged from staff members of: British Council, Amsterdam; Eindhoven University of Technology, Library, Eindhoven; Netherlands American Commission for Educational Exchange (NACEE), Amsterdam.

REFERENCES


Appendix 1.

BRITISH ASSOCIATIONS

British Computer Society. (BCS) 1957.
13 Mansfield Street, London W1M 0BP. 01-637 0471.
Sec Gen: D W Harding.

Br 42
O *p
Gp ACM Chapter; Advanced programming; Algol; APL users;
Auditing by computer; British Computer Association
of the Blind; British Pattern Recognition Association;
Business information systems; Cobol; Computer aided
design; Computer Arts Society; Computer information;
Coral 66; Data transmission; Data base
communications; Display; Fortran; Group for the
disabled; Group for computers & employment;
Computers in psychology (BPS); Human aspects of
computer usage; Law; Logic design; Mathematical
programming; Measurement of computer performance;
Medical - Northern, London, Scotland; Microform;
PL/I; Software engineering; Study group on computers
in survey analysis; UK Simulation Council;Word
processing & office information; Developing countries;
Expert systems; Formal aspects of computing science;
Information retrieval; Local government
microprocessors; Process control; Realtime &
algorithmic languages.

• Conf (biennial) - Mtgs - ET - Exam - SG - Inf -
Library (with IEE - 01-240 1871).
< ACM; IFIP; ECI; Nat Computer Users Forum.
M 25,000 i, 236 f, 60 schools.
† Computing - 52; ftm.
Computer Bulletin - 4; ftm, £10 yr nm.
Computer Jnl - 4; ftm, £35 yr nm.

Operational Research Society. (ORSoc) 1954.
6th floor, Neville House, Waterloo Street, Birmingham
B2 7TX. 021-643 0236. (hq)
Sec: R A Showell.
Br Birmingham, Newcastle upon Tyne, Manchester, Glasgow,
Cardiff, Bristol, York, London.
O *L, *Q
Gp Banking & finance; Construction industries; Educational
systems; Forecasting; Health & Welfare Services;
Inventory & production control; Methodology process
of OR; Simulation discussion; Mathematical
programming; OR & social organisation; System
dynamics; Transport.
• Conf - Mtgs - SG - Inf - Library.
M 3,400 i, 85 f & org.
† Operational Research Quarterly - 4; ftm.
NL - 12. LM - 1; ftm.
Careers booklet.
ARL
(NR - ?)

Operations Research Society of Ireland. (ORSI)
IRL 31 Pembroke Road, Ballsbridge, Dublin 4. t 684031.
Validity indicators:
- entry based on questionnaire or other documents returned by organisation
(NR - 7) following an entry indicates that the organisation did not return a
questionnaire or revision document for this edition
IRL Irish entry - see Introduction 3c
§ organisation outside normal scope of DBA, but included for the
convenience of users
** present address unknown

Address
t telephone number
tx telex number
asa firm of accountants or solicitors
hq organisation's permanent
headquarters
Br Branch(es)

Name of secretary or chief executive, with designation of office held:
Chmn Chairman
Dir Director
Exec Executive
Gen Sec General secretary
Hon Sec Honorary secretary

O Type of organisation & sphere of interest; indicated by one or more of the following letters, with an
amplification or explanation only when necessary; if an organisation's interests are obvious from its
name, only the starred letter is given -
*A Art societies
*B Breed societies controlling the registration of pedigree livestock
*C Chambers of commerce & industry or chambers of trade
*E Educational associations
*H Horticultural & agricultural societies
*K Campaigns seeking to achieve a once-for-all purpose; and pressure groups
*L Learned, scientific & technical societies
*M Co-ordinating bodies
*P Professional associations, institutes, &c
*Q Research associations
*R Religious organisations
*S Sports organisations
*T Trade, employers' & other associations furthering business interests
*U Trade unions & other employees' associations primarily negotiating pay &
conditions of service
*W Welfare organisations & charities
*X International friendship
*Y Youth organisations
*Z Political organisations

M Membership data
i = individuals  f = firms  org = organisations

Activities
Comp Competitions
Conf Conference - annual unless otherwise stated
Empl Negotiation of pay & conditions of employment
ET Education &/or training for professional or other qualifications
Exam Examinations for professional or other qualifications
Exhib Exhibitions & shows
Expt Export promotion
Inf Information service available for all serious enquirers
Inf (m) Information service available only to members
Mtgs Regular meetings
Res Scientific or other systematic research
St Study groups
Stat Collection of statistics
VE Visits & excursions

< Affiliations to other organisations

Publications
AR Annual report
ftm free to members - i.e. included in subscription
Jnl Journal
LM List of members
m members
NL News letter
nm non-members
Ybk Year book
yr per annum

X Former name or names of organisation if changed during past 5 years (preceded by date of change)

"CCB" "Councils, Committees & Boards" (see Introduction - 6)
NATIONAL ORGANIZATIONS OF THE U.S.

Section 1 — TRADE, BUSINESS AND COMMERCIAL ORGANIZATIONS

**1985**

**AMERICAN INSTITUTE OF MAINTENANCE (AIM)**  
P.O. Box 2644  
Gendale, CA 91209  
Phone: (213) 244-1176  
Charles F. Wheeler, Jr., Sec.  
Founded: 1958. Members: 2244. Staff: 4. Individuals and organizations active in cleaning maintenance and management. Has developed home study educational courses and publications to promote self-improvement and efficient work methods. Maintains library of books, booklets and articles on building maintenance. Publications: Cleaning Management, monthly; also publishes maintenance supervision course and four educational booklets.

**1987**

**AMERICAN INSTITUTE OF MANAGEMENT (AIM)**  
607 Boylston St.  
Boston, MA 02116  
Phone: (617) 536-2503  
William J. Lessard, Mgr.Dr.  

**1984**

**INTERNATIONAL MAINTENANCE INSTITUTE (IMI)**  
P.O. Box 26695  
Houston, TX 77207  
Phone: (713) 649-6973  
John E. Schrott, Bd.Chm.  
Founded: 1961. Members: 1400. Local Groups: 16. Persons directly engaged in maintenance in a key position (supervisor, foreman, manager, etc.) for chemical refineries, manufacturing firms, government agencies, institutions and other organizations; associate members are persons indirectly engaged in maintenance in sales, service, consulting, or publications capacities. Assembles and disseminates maintenance information related to modern cost-saving methods, processes, and equipment. Local chapters sponsor lectures and discussions on such topics as preventive maintenance, electrical specification and maintenance, purchasing procedures, painting, heating, and grounds maintenance. Publications: IMI Newsletter, bimonthly; IMI News, monthly; IMI Conference/Meeting: annual.

**1989**

**ADMINISTRATIVE MANAGEMENT SOCIETY (AMS)**  
135 W. 50th St.  
New York, NY 10020  
Phone: (212) 569-4300  
John R. Herb, Acting Exec.Dir.  
Founded: 1919. Members: 13,000. Staff: 25. Local Groups: 150. Office managers, supervisors, personnel men, educators, equipment manufacturers and utility company executives. Promotes application of scientific methods to commerce and industry for the purpose of increasing productivity, lowering costs, and improving quality; assists educational institutions in developing training programs and courses of study; encourages participation in research; promotes sound employee and employer relationships; maintains library of 2500 volumes. Presents Merit Awards, sponsors professional accreditation for certified administrative manager. Other activities: (1) Publishes: (A) Generalist, monthly; (2) Impact: In Information Technology, monthly; (3) Management World, monthly; (4) AMS Yearbook; (5) Mid-Management Salary Guide, annual; (6) Office Salary Surveys, annual; (7) Office Employee Turnover, biennial; also publishes reports. Formerly: National Association of Office Managers; (1964) National Office Management Association. Convention/Meeting: annual — always May. 1980 Milwaukee, WI; 1981 Phoenix, AZ; 1982 San Francisco, CA; 1983 Toronto, ON, Canada.

**1986**

**AMERICAN INSTITUTE OF PRODUCTION AND INVENTORY CONTROL (APICS)**  
301 W. 50th St.  
New York, NY 10020  
Phone: (212) 586-8100  
F. G. Harmon, Pres.  
Founded: 1957. Members: 125. Overseas division of American Management Associations. To develop management education services overseas and to serve as an international organization extending and adapting AMA techniques and services in the international business community. Conducts over 500 meetings a year; Executive Compensation Service; in-company film programs. Management center locations: Brussels, Belgium; Sao Paulo, Brazil; Mexico City; Mexico, PQ and Toronto, ON, Canada. Formerly: International Management Association.

**1989**

**AMERICAN INJECTION MOLDING ASSOCIATION (AIM)**  
7425 Old York Rd.  
Philadelphia, PA 19126  
Phone: (215) 635-5900  
Christy Carr, Gen.Mgr.  
Founded: 1899. Members: 180. Staff: 10. Companies in electrical, automotive, textile, chemical, paper and insurance fields; banks; colleges and universities; town and city government hospitals. Conducts activities in the industrial relations and industrial management fields; gives advice and/or assistance in all aspects of labor relations, training, industrial relations, research, management and supervisory education, job and salary rating and communications. Publications: (1) Consumer Price Cost of Living Index, monthly; (2) The Executive Manager, monthly; (3) Signs of the Times, monthly. Formerly: (1945) National Metal Trades Association.

**1984**

**AMERICAN MANAGEMENT ASSOCIATIONS (AMA)**  
135 W. 50th St.  
New York, NY 10020  
Phone: (212) 586-8100  
James L. Hayes, Pres. & Chief Exec.  
Founded: 1923. Members: 70,000. Managers in industry, commerce, government and non-commercial entities; charters local management associations; university teachers of management; administrators. "To provide quality programs, products and services to the managerial process." AMA's educational programs serve every level of management in all parts of the world through excellence, practical instruction primarily by other practicing managers, books, periodicals and special reports, plus research into basic and advanced principles of management. Conducts conferences, seminars, courses, briefings and workshops on management topics spanning 12 divisional areas of interest. Surveys and reports on current organizational problems and practices. Award annual Henry Laurence Gantt Medal for distinguished achievement in management as a service to the community. Maintains "Correspondent Associations" agreements around the world. Operates management centers and offices in North America and, through AMA/International, in Europe and South America. Maintains extensive library, book store and Management Information Service including films, cassettes, tapes and records covering all areas of management expertise. Corporate Divisions: Advanced Management Information (publishing); Center for Management Development (seminars); Center for Planning and Implementation (long-range team planning); Extension Institute (study-at-home programs); In-Company Development and Training; National Association of Corporate Directors (for board members); National Center for Career Life Planning (career life and pre-retirement programs); Presidents Association (for chief executives); Professional Institute (public sector); Society for Advancement of Management (senior and college chapters); U.S.-Canada; U.S.-International. Seminar Divisions: Finance; General and Administrative Services; General Management; Human Resources; Information Systems and Technology; Insurance and Employee Benefits; International; Manufacturing; Marketing; Packaging; Purchasing; Transportation and Physical Distribution; Research and Development. Publications: (1) Approach: monthly; (2) Directors, monthly; (3) Health Services Manager, monthly; (4) Management Digest, monthly; (5) Management Review, monthly; (6) SAM News International, monthly; (7) Supervisory Management, monthly; (8) The President, monthly; (9) Personnel, bimonthly; (10) Compensation Review, quarterly; (11) Organizational Dynamics, quarterly; (12) SAM Advanced Management Journal, quarterly; (13) Management Development Guide, semiannual; also publishes management briefings, survey reports and other documents in the fields of human resources, management and international trade, government service, wage and salary. Absorbed: (1924) National Association of Sales Managers; (1973) American Foundation for Management Research. Formerly: (1923) National Personnel Association. Formed by merger of: National Association of Corporation Schools and National Association of Employment Managers. Convention/Meeting: - always September, New York City. Also holds Human Resources, Insurance and Employee Benefits Conference and Packaging Conference, biennial, in conjunction with International Packaging Week.
**905**

**SOCIATION FOR SYSTEMS MANAGEMENT (ASM)**

387 Bagley Rd.

Phone: (216) 243-6900


Members: 1,000.

Staff: 15.

Local Groups: 135.


---

**906**

**WORLD COUNCIL OF MANAGEMENT (CIOS)**

3 Nederlandse Vereniging Voor Management

Alkemade 700

2019 The Hague, Netherlands

A. Bouwens, Acting Sec.

Founded: 1926.

Members: 40.


---

**911**

**INSTITUTE OF MANAGEMENT CONSULTANTS (IMC)**

19 W. 44th St., Suite 810-811

New York, NY 10036

Phone: (212) 921-2885

John F. Hartshorne, Exec.Dir.

Founded: 1968.

Members: 850.

Staff: 4.

Individual consultants work who alone or in consulting firms that meet the Institute's requirements. Examines qualifications of consultants who apply and issues certificates to those meeting standards of practice, education and experience. The Institute sponsors conferences, seminars and research on various aspects of management consulting. Publications: Newsletter, irregular. Convention/Meeting: annual.

---

**912**

**THE INSTITUTE OF MANAGEMENT SCIENCES (TIMS)**

146 Westminster St.

Providence, RI 02903

Phone: (401) 274-2525

M. R. Defesle, Exec.Dir.

Founded: 1953.

Members: 6500.

Staff: 6.

Local Groups: 57.

Professional society for scientists and management in business, labor, government, teaching, and research. Aim is to advance scientific knowledge and improve management practices; members contribute to or learn about important findings in management technology, electronics, applied mathematics, psychology, economics, and other sciences. Sponsors competition for papers on successful applications of management science. Colleges: Applied Probability; Energy and Natural Resources Management; Information Systems; Logistics; Management Control Systems; Management Philosophy; Management of Technological Change; Marketing; Measurements in Management; On-Line Decision Systems; Organization; Planning; Practice of Management Sciences; Public Program and Processes; Research and Development Problems; Societal Problems; Simulation and Gaming. Publications: (1) Management Science, monthly; (2) OR/MS Today (newsletter), bimonthly; (3) Interfaces, quarterly; (4) Mathematics of Operations Research, quarterly; (5) Roster and Bylaws, biennial; also publishes Proceedings of Symposium on Planning and special issues on education, ecology, urban issues, game theory and gaming, and marketing management models. Convention/Meeting: semiannual - 1980 May 4-7, Washington, DC and Nov. 10-12, Houston, TX; 1981 May 3-6, Toronto, ON, Canada and Oct. 17-21, Colorado Springs, CO; 1982 Apr. 18-21, Detroit, MI.

---

**914**

**INTERNATIONAL ACADEMY OF MANAGEMENT**

C/O NIVIE

Nederlandse Vereniging Voor Management

Alkemade 700

NL-2019 The Hague, Netherlands

Dr. Harald Kooit, Charlel


Members: 180.

Regional Groups: 4.

Membership is composed of leaders in management from six continents and twenty-three countries. To provide the members of CIOS with a consultative organ at the international level for fundamental research in evolving and advancing theories of practical and philosophical management; to provide a body to safeguard the objectivity and precision of the art and science of managing and the discipline of integration of new/progressive managerial trends; to exert intellectual stimulus to all interested in management; to structure CIOS so that qualified individual members may contribute. Fellows are elected annually on the basis of their achievements in the art and science of management, particularly in international context. Presents fellowship; maintains research programs. Committees: Special Projects. Affiliated with CIOS - World Council of Management. Convention/Meeting: triennial - 1981 Lima, Peru.

---

**915**

**INTERNATIONAL MANAGEMENT COUNCIL (IMC)**

291 Broadway

New York, NY 10007

Phone: (212) 374-2159

Albert J. Benglen, Exec.Dir.

Founded: 1935.

Members: 13,000.

Staff: 3.

Regional Groups: 135.

Supervisors and managers in all fields. "To help supervisors and managers develop as leaders in their industries and be in their countries." Committees: Chapter Standards; Education; Financial Development; Leadership Development; Public Relations. Groups: Case Solution; Conference Leadership; Management Development. Affiliated with: Young Men's Christian Association (sponsor). Formerly: (1948) National Council of Foreigners' Clubs (1971) National Council of Industrial Management Clubs. Convention/Meeting: annual - 1980 May 28-31, Norfolk, VA.

---

**916**

**INTERNET-INTERNATIONAL (Management) (IMSA)**

C/O Gottlieb Duttweiler Institute

Rothikon

CH-8803 Zurich, Switzerland

M. Braune-Krickau, Sec.


Members: 7.

National project management associations united for international coordination of their activities. Acts as focus for international activities for the exchange of management systems knowledge and promoting the advancement of seven project management methods, systems and techniques for practical applications. Encourages the development of and cooperates with national organizations with common interests and offers mechanism for individual participation for those countries that do not yet have an established national society. Publications: Proceedings of Seminars and Congresses. Formerly: International Management Systems Association. Also Known As: INTERNET. Convention/Meeting: biennial - 1980 June, Zurich, Switzerland; 1981 September, Copenhagen, Denmark.

---

**917**

**JAPAN TECHNO-ECONOMICS SOCIETY (Management) (JATES)**

Masuda Building

4-5 Iidabashi 2 Chome

Chiyoda-Ku

Tokyo, Japan

Shoichi Moriyama, Exec.Dir.


Members: 2876.

Staff: 20.

Regional Groups: 2.

Individuals (2760) and corporations (216) unite to: study and explore the prospect of technological innovations and provide a vision of the future society; study new management techniques and develop their application to business management; promote the establishment of Japan's own methods of research and development management; foster men of talent to be leaders of management in the new age; offer a forum for exchange of information and cooperation to specialists from various fields; promote international exchange of views and achievements. Sponsors international seminars and symposiums; international Future Industry Survey Team; panel discussions; and Tokyo office of the Club of Rome. Maintains library. Divisions: Accounting; General Affairs; International; Operations; Planning; Research. Publications: Technology and Economy, monthly; also publishes numerous reports. Affiliated with Industrial Research Institute. Convention/Meeting: annual; also holds annual International Symposium.
Section 4 — SCIENTIFIC, ENGINEERING AND TECHNICAL ORGANIZATIONS

Phone: (212) 586-8100
135 W. 50th St.
New York, NY 10020
Robert L. Dimit, Exec.Dir.

### American Automatic Control Council (AACC)

C/O Mr. A. M. Keys
Bailey Meter Co.
29801 Euclid Ave.
Westlake, OH 44192
Phone: (216) 943-5500
M. A. Keys, Sec.
Founded: 1957. Members: 8. Federation of 8 professional, scientific and engineering societies, in which a division or group is actively engaged in control engineering; covers the field of automatic control (including control of mechanical processes, computer control, process control, navigation and guidance). Presents Eckman Award and JACC Award. Committees: Automation Research Councils; Biomedical Engineering; Components and Terminology; Education; International Relations; Manufacturing Technology; Social Effects of Automation; Space; Systems Engineering; Theory. Affiliate with: International Federation of Automatic Control. Convention/Meeting: annual Joint Automatic Control Conference.

### International Federation of Automatic Control (IFAC)

C/O Prof. Y. Sawaragi
Dept. Applied Mathematics & Physics
Faculty Of Engineering
Kyoto University
Kyoto, Japan

Founded: 1957. Members: 40. Staff: 2. National organizations represent the engineering and scientific societies of their individual countries. Purpose to promote the science and technology of automatic control in the broader sense in all systems whether engineering, physical, biological, economic in both theory and application, and to study the impact of automatic control on society. Seeks to promote the science of automatic control through the interchange and circulation of information on automatic control activities; cooperation with national and other international organizations; international congresses; and other means such as publications. Committees: Advisory Applications; Biomedical Engineering; Components and Instrument Computers; Developing Countries; Economic and Management Systems; Education; Manufacturing Technology; Mathematics of Control; Policy; Public Affairs; Social Effects of Automation; Space; Systems Engineering; Terminology and Standards; Theory. Publications: (1) Automatica, bimonthly; (2) Newsletter, irregular; (3) Proceedings (of conferences, congresses, etc.); irregular; also publishes Multilingual Dictionary of Automatic Control Terminology and other monographs. Convention/Meeting: triennial world congress - 1981 Aug. 24-29, Kyoto, Japan.
<table>
<thead>
<tr>
<th>Organization</th>
<th>Type</th>
<th>Field</th>
<th>Founded</th>
<th>Members</th>
<th>Staff</th>
<th>Key Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEEE</td>
<td>Professional Society</td>
<td>Electrical and Electronic Engineering</td>
<td>1963</td>
<td>180,000</td>
<td>250</td>
<td>Conferences, journals, standards development</td>
</tr>
<tr>
<td>AMERICAN INSTITUTE OF INDUSTRIAL ENGINEERS (AIIIE)</td>
<td>Professional Society</td>
<td>Industrial Engineering and Management</td>
<td>1948</td>
<td>31,000</td>
<td>33</td>
<td>Conferences, awards, publications</td>
</tr>
<tr>
<td>ASLIB</td>
<td>Professional Society</td>
<td>Information Management</td>
<td>1928</td>
<td>2150</td>
<td>60</td>
<td>Conferences, journals, publications, courses</td>
</tr>
<tr>
<td>AMERICAN FEDERATION OF INFORMATION PROCESSING SOCIETIES (AFIPS)</td>
<td>Professional Society</td>
<td>Information and Communication</td>
<td>1961</td>
<td>4000</td>
<td></td>
<td>Conferences, journals, publications</td>
</tr>
<tr>
<td>ASSOCIATED INFORMATION MANAGERS (Information Processing)</td>
<td>Professional Society</td>
<td>Information Management</td>
<td>1978</td>
<td>500</td>
<td>30</td>
<td>Conferences, journals, publications</td>
</tr>
</tbody>
</table>

For more information, visit the respective organization's website.
**Association of Computer Programmers and Analysts (Information Processing) (ACPA)**

P.O. Box 8105
Dearborn, MI 48128

Phone: (303) 499-1722

Boulder, CO 80303

Mr. Hilé Segal, Pres.

Founded: 1975.

Members: 500. Staff: 4. Users and prospective users of computer technology and systems, including those interested in using computer technology and systems in business applications; promotes the development and use of computer technology and systems in the business field; promotes the exchange of ideas and information among professionals in the field; provides a forum for discussion and the exchange of ideas and information; sponsors workshops, seminars, and conferences; operates a newsletter.

**Association for Computing Machinery (Information Processing) (ACM)**

1133 Ave. Of The Americas
New York, NY 10036

Phone: (212) 265-6300

Sidney Weinstein, Exec. Dir.


Members: 40,000.

Staff: 50. Local Groups: 300.

Mathematicians, engineers, physical scientists, business system specialists, analysts, and social scientists interested in computing and data processing.

**Association of Microcomputer Users (Information Processing) (AMU)**

4728

P.O. Box 8105
Dearborn, MI 48128

Bernard M. Salait, Exec. Dir.


Members: 1,500.

Staff: 4. Local Groups: 4.

Microcomputer users and professionals concerned with all aspects of microcomputers.

**Association for Literary and Linguistic Computing (ALLC)**

Literate and Linguistic Computing Center
Sidwicke St.

Cambridge CB3 9DA, England

Dr. John L. Dawson, Sec.


Members: 444.

Local Groups: 30. Individuals who are interested in or have an interest in the use of computing and/or computing (400 users) to any aspect of research by computer and to provide a means of communication for all those concerned with such research. Sponsors symposia and conferences in literary and linguistic computing. Holds seminars on computing techniques, primarily for linguists and librarians. Maintains small library of research papers and books and texts in machine readable form.

**Association of Small Computer Users (Information Processing) (ASCU)**

75 Manhattan Dr.

Phone: (303) 499-1722

Boulder, CO 80303

Mr. Hilé Segal, Pres.


Members: 2,000.

Staff: 4.

Users and prospective users of small computers for business or scientific applications.

**Computer and Automated Systems Association of SME (CA/SME)**

One SME Drive, Box 930

Phone: (213) 271-1500

Deer Park, MI 48129

Bernard M. Salait, Exec. Dir.

Founded: 1975.

Members: 3,500.

Staff: 5. Sponsors by Society of Manufacturing Engineers. Individuals interested in using computer systems and automation as related to manufacturing technology. Attempts to provide liaison among industry, government, education, and the SME Technical Council to keep abreast of the total resource distribution of computer systems and automation within the scope of the Association. Offers access to computer and automation systems technologies within functional areas of manufacturing and within integrated application groupings. Holds national seminars on systems integration. Committees: Dissemination and Transfer; Environment; Equipment Justification; Incentives for Development; Resources and Priorities.

**Guides to Computing Literature**

(1) Bibliography: quarterly; (2) Newsletter, quarterly; (3) Journal of Computers; (4) Proceedings; (5) Transactions; (6) Newsletter, bi-monthly; (7) Transactions on Programming; (8) Newsletter, bi-monthly; (9) Transactions on Information Processing; (10) Newsletter, bi-monthly; (11) Transactions on Programming; (12) Newsletter, bi-monthly.

**Information Processing (IP)**

(1) Bibliography: quarterly; (2) Newsletter, quarterly; (3) Journal of Computers; (4) Proceedings; (5) Transactions; (6) Newsletter, bi-monthly; (7) Transactions on Programming; (8) Newsletter, bi-monthly; (9) Transactions on Information Processing; (10) Newsletter, bi-monthly; (11) Transactions on Programming; (12) Newsletter, bi-monthly.

**Linguistic and Logical Computing**

(1) Bibliography: quarterly; (2) Newsletter, quarterly; (3) Journal of Computers; (4) Proceedings; (5) Transactions; (6) Newsletter, bi-monthly; (7) Transactions on Programming; (8) Newsletter, bi-monthly; (9) Transactions on Information Processing; (10) Newsletter, bi-monthly; (11) Transactions on Programming; (12) Newsletter, bi-monthly.

**Mathematical Software**

(1) Bibliography: quarterly; (2) Newsletter, quarterly; (3) Journal of Computers; (4) Proceedings; (5) Transactions; (6) Newsletter, bi-monthly; (7) Transactions on Programming; (8) Newsletter, bi-monthly; (9) Transactions on Information Processing; (10) Newsletter, bi-monthly; (11) Transactions on Programming; (12) Newsletter, bi-monthly.

**Small Computer Systems**

(1) Bibliography: quarterly; (2) Newsletter, quarterly; (3) Journal of Computers; (4) Proceedings; (5) Transactions; (6) Newsletter, bi-monthly; (7) Transactions on Programming; (8) Newsletter, bi-monthly; (9) Transactions on Information Processing; (10) Newsletter, bi-monthly; (11) Transactions on Programming; (12) Newsletter, bi-monthly.
**INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING**

IFIP 3 Rue Du Marché
CH-1204 Geneva, Switzerland
Prof. P. A. Bobillier, Pres.

**INTERNATIONAL WORD PROCESSING ASSOCIATION (IWP)**

Maryland Rd.
Wilkes Grove, PA 19090
Lorraine Lean, Dir.
Founded: 1972. Members: 6500. Staff: 12. Individuals interested or actively participating in the development and use of improved word-processing methods and systems. Word processing describes "new, sophisticated technology designed to transform the written, oral or recorded word into type or printed form for distribution." The concept is also described as "word origin, production and distribution." IWP is primarily oriented toward internal text-based information systems within companies and deals with application of word processing to word-processing systems and the transfer of ideas to paper or electronic media.

**INTERNATIONAL ASSOCIATION FOR MATHEMATICS AND COMPUTERS IN SIMULATION (IMACS-AICA)**

H 496 Ave. Moliere
B-1060 Brussels, Belgium
Prof. R. Vichnevetsky, Chm.Mgmt.Comm.

**ENVIRONMENTAL DATA SERVICE (Information Processing) Formerly:**

Founded: 1961. Members: 35,000. Establishes standards and provides channels to facilitate the exchange of computer programs among members, and provides feedback to the manufacturer on equipment and programming needs. Publications: (1) Decuscope, quarterly; (2) Program Library Catalog, annual; (3) Meeting Proceedings, irregular. Convention/Members: 10/year.

**ECOLOGY FORUM (Information Processing)**

See Index

**ENVIRONMENTAL DATA SERVICE (Information Processing)**

See Index

**INDEPENDENT COMPUTER CONSULTANTS ASSOCIATION (Information Processing) (ICCA)**

P.O. Box 27412
St. Louis, MO 63141
Phone: (314) 567-9708
Steven A. Epper, Pres.

**INSTITUTE FOR CERTIFICATION OF COMPUTER PROFESSIONALS (Information Processing) (ICCP)**

35 E. Wacker Dr.
Chicago, IL 60601
Phone: (312) 782-9437
Founded: 1973. Members: 8. Staff: 2. Associations of computer professionals. Objectives are the development of computer examinations which are of high quality and directed toward all levels of management and which are designed to encourage competence and professionalism. Has developed code of ethics and good practice to which those taking the exams promise to adhere. Gives awards for top scores on examinations; compiles statistics. Committees: Public Information. Publications: Newsletter, quarterly. Convention/Members: semiannual.

**SOCIETY FOR COMPUTER SIMULATION (SCS)**

PO Box 2226
La Jolla, CA 92038
Phone: (714) 459-2888
C. G. Stockton, Exec.Dirk.
Founded: 1952. Members: 1500. Regional Groups: 9. Persons engaged in simulation, particularly the use of computers and similar devices which employ mathematical or physical analogs. Sponsors annual conferences and simulation conferences; also holds three to six meetings per year. Committees: Business Simulation Practices; College and University Education; Continuous System Simulation Libraries; Model Credibility; Numerical Methods; Software for Hybrid Computers; Summer Computer Simulation Conference; Systems Ecology; Technical Meetings. Publications: (1) Simulation, monthly; (2) Proceedings, semiannual. Affiliated with American Federation of Information Processing organizations.


TEXAS INSTRUMENTS MINICOMPUTER INFORMATION EXCHANGE (Information Processing) (TI-MIX) P.O. Box 2909 M/S 2Z00 Austin, TX 78769 Phone: (512) 250-7157 Founded: 1973. Members: 4000. Regional Groups: 8. Owners or lessees of Texas Instruments (TI) minicomputers; others with an active interest in these systems or related equipment. To promote among users of TI minicomputers, and between users and TI, the exchange of information pertaining to these systems and related equipment. Members have the opportunity to constructively influence the design and development of these systems. Maintains library. Committees: Systems. Publications: (1) TI-MIX News, monthly; (2) TI-MIXER, quarterly; also publishes catalog. Convention/ Meeting: annual Symposium - 1980 March, Dallas, TX. Also holds regular meetings.

URBAN AND REGIONAL INFORMATION SYSTEMS ASSOCIATION (Information Processing) (URISA) C/O Municipal Finance Officers Assn. 180 N. Michigan Ave. Chicago, IL 60601 Phone: (312) 977-9700 Dorothy Bomberger, Pres. Founded: 1964. Members: 1500. Staff: 1. Regional Groups: 20. Individuals interested in all phases of information systems (systems analysis, planning, graphics, evaluation, geographic base files, geocoding, systems design, systems implementation, data base management, operation analysis, public information, public administration, highway and traffic information, communication, information systems modeling). Dedicated to the advancement of information capabilities relating to urban areas. Is developing research and education programs. Publications: (1) Newsletter, bimonthly; (2) Annual Conference Proceedings; also publishes Directory, professional papers, monographs and other reports. Convention/ Meeting: annual - always August. 1980 Toronto, ON, Canada or New Orleans, LA; 1981 Toronto, ON, Canada or New Orleans, LA.

USE INC. (Information Processing) Box 461 Boca Raton, FL 33426 Phone: (305) 699-9336 Founded: 1975. Members: 350. Regional Groups: 8. International organizations relying on large scale computers. Promotes free interchange of ideas and information concerning system utilization; provides opportunities for technical interchange and understanding among users; provides a forum where users may present concrete, product development recommendations for the mutual benefit of the users and computer manufacturers; acts as an interface with other similarly motivated organizations and the computer industry in general. Committees: Applications Development; Performance and Evaluation; TIP; Recovery; User Communications. Publications: (1) Newsletter, monthly; (2) Administrative Minutes, quarterly; (3) Conference Software Notes, quarterly; (4) Technical Papers, semiannual; also publishes Reference Manual and Task Force Reports. Also Known As: Univac Scientific Exchange. Convention/ Meeting: semiannual conference - 1980 Mar. 10-14, Salt Lake City, UT and Oct. 6-10, Cleveland, OH.

WORD PROCESSING SOCIETY, INC. (Information Processing) (WPSI) P.O. Box 92553 Milwaukee, WI 53202 Phone: (414) 276-8835 Founded: 1972. Members: 450. Individuals concerned with word processing as a profession. Purposes are: to provide mutual assistance; to develop word processing systems for industry; to encourage word processing educational programs with universities and their libraries; to publicize word processing. Conducts seminars for teachers, business students, and word processing specialists. Offers specialized seminars for schools, trade associations and conventions. Conducts surveys; bestows awards. Committees: Education; Reciproc. Publications: (1) The Word, monthly; (2) Directory, annual; also publishes glossary. Convention/ Meeting: annual Expo-Smar - 1980 Mar. 26-28, Lake Geneva, WI; 1981 Apr. 1-3, Milwaukee, WI.
**5014**

BATTEN MEMORIAL INSTITUTE (Research) (BMIT)

505 King Ave.

Phone: (614) 424-6424

Columbus, OH 43220

Founded: 1929. Staff: 6900. Non-profit, public-purpose organization. Institute conducting scientific research on a contract basis for industrial firms and government agencies in chemistry, biochemistry, metallurgy, physics, energy, computer technology, electronics, nucleonics, ceramics, transportation, education and training, environmental quality, medical engineering, urban problems, mechanical engineering, and many other fields. Has research centers at Geneva, Switzerland; Frankfurt/Main, Germany; Richmond, VA; and Columbus, OH. Conducts educational programs, including seminars and fellowships. Subsidiary corporation works to stimulate use of technological discoveries in industry. Columbus Laboratories maintain library of over 150,000 volumes; other research centers also have library facilities. Publications: (1) Battelle Today; quarterly; (2) President's Report and Annual Review; (3) Published Papers and Articles, annual; also publishes original research papers, articles, and abstracts.

**5028**

AMERICAN STATISTICAL ASSOCIATION (Statistics) (ASA)

601 15th St., N.W.

Phone: (202) 393-3253

Washington, DC 20005


**5078**

INTERNATIONAL STATISTICAL ASSOCIATION

7 Pr. Beatristman

P.O. Box 778

NL-2503 EY The Hague, Netherlands

Dr. J. C. Gerritsen, Sec-Gen.

Founded: 1939. Members: 250. Staff: 8. Manufactures and industrial firms maintaining industrial research laboratories. To promote through the cooperative efforts of its members improved, economical, and objective techniques of organization, administration and operation of industrial research.

Conducts: Advanced Study Groups; Education; Emeriti; Federal Science and Technology; Management Study Groups; Plans and Policies; Research; Conferences, Meetings; Publication: Research Management, bimonthly.

Convention/Meeting: annual - always May. 1980

Tarpon Springs, FL; 1981 Scottsdale, AZ; 1982 Palm Beach, FL; 1983 White Sulphur Springs, WV.

**5090**

INTERAMERICAN STATISTICAL INSTITUTE

C/O Organization Of American States

Washington, D.C. 20017

Phone: (202) 393-3253

Founded: 1929. Non-profit, public-purpose organization. Maintains over 150,000 volumes; other research centers also have library facilities. Publications: (1) Battelle Today; quarterly; (2) President's Report and Annual Review; (3) Published Papers and Articles, annual; also publishes original research papers, articles, and abstracts.

**5092**

ECONOMOMIC SOCIETY (Statistics) (ES)

Dept. Of Economics

Northwestern University

Evanston, IL 60201

Phone: (312) 492-3615

Robert J. Gordon, Treas.


**5095**

INSTITUTE FOR ECONOMETRIC RESEARCH (Statistics) (IER)

3471 N. Federal Hwy.

Miami, FL 33140

Phone: (305) 561-5105

Norman G. Fosback, Pres.


**5084**

INSTITUTE OF MATHEMATICAL STATISTICS (IMS)

Dept. Of Statistics And Probability

Michigan State University

East Lansing, MI 48824

Martin Fox, Exec.Sec.


**5085**

INTER AMERICAN STATISTICAL INSTITUTE (Statistics) (ASI)

C/O Organization Of American States

Washington, D.C. 20006

Phone: (202) 331-1010

Founded: 1940. Governments of nations which are members of the Organization of American States or governments of nations not members of OAS which have adhered to the Institute; official or unofficial agencies, institutions, organizations or offices of the Western Hemisphere which are engaged in statistical work; individuals in the Western Hemisphere distinguished for their professional attainments and for their contributions to statistical science and the development of statistics; persons occupying...
statistical offices or having certain representative capacities in national and international agencies and associations working wholly or in part in the field of statistics. Fosters statistical development in the Western world, specifically by seeking "to stimulate improved methodology in the collection, tabulation, analysis and publication of both official and unofficial data, to encourage measures designed to improve the comparability and utility of economic and social statistics among the nations of this area, to provide a medium for professional statistical collaboration and cooperation among and between national and international organizations, to encourage the science and administration of statistics." Activities of the Association are coordinated with Organization of American States by agreement.


5097* INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

Schloss Laxenburg
A-2361 Laxenburg, Austria
Roger E. Levien, Dir.
Founded: 1972. Members: 90. Members are national academies of sciences or national scientific committees. Develops and applies models and methods of investigation and analysis which shall make use of systems analysis methodology and modern management principles in order to predict, evaluate and manage policy alternatives for dealing with complex societal problems. Sponsors research projects on: energy, food; and agriculture; resources and environment; human settlements and services; management and technology; system and decision sciences. Publications: (1) Options (newsletter), quarterly; (2) Conference Proceedings, irregular; (3) Research Memoranda, irregular; (4) Research Reports, irregular; also publishes monographs.

5098* SOCIETY FOR GENERAL SYSTEMS RESEARCH (SGSR)

Linder nr 6, Rm. 601
2023 G slips., N.W.
Washington, DC 20052
Richard F. Webster, Pres.
Founded: 1955. Members: 1000. Regional Groups: 5. Businessmen and professional scientists, psychologists, social scientists, psychiatrists, medical researchers, and others interested in general systems research. To encourage development of theoretical systems which are applicable to more than one of the traditional departments of knowledge; to investigate isomorphism of concepts, laws, and models in various fields and help useful transfers from one field to another; encourage development of adequate statistical models in fields which lack them; minimize duplication of theoretical effort in different fields; promote unity of science through improving communication among scientists. Publications: (1) Behavioral Science (journal), bimonthly; (2) General Systems Bulletin, 3/year; (3) General Systems Yearbook; (4) Managing Directors Letter, irregular; (5) Proceedings of Annual Meetings; (6) Proceedings of Regional Meetings, irregular. Affiliated with: American Association for the Advancement of Science; UNESCO. Founded: (1955) Society for the Advancement of General Systems Theory. Convention/ Meeting: annual - with AAS. Also holds annual regional meetings in the U.S.

Section 5 — EDUCATIONAL ORGANIZATIONS

5281* AMERICAN INSTITUTE FOR DECISION SCIENCES (Business)

University Plaza
Atlanta, GA 30303
Dennis Grawioz, Exec.Dir.
Appendix 3.

INTERNATIONAL ORGANIZATIONS

A: Federations of international organizations

"A.3893/y Five International Associations Coordinating Committee (FIACC) "

Coordinating Committee of five associations internationales

Hen Sec Prof Dr Gy Striker, IMKEX, PO Box 457, H-1371 Budapest, Hungary. T 324 116. C. IMKEX Budapest, Txs 22-57-82 mtrans h.


The FIACC is an informal association of, or international organizations which aim at promoting the empirical-quantitative approach to knowledge and promoting high professional standards in the development of a unified management science.

Annually in Helsinki, Finland. (IFACC) 1962.1137.

B: Universal membership organizations

"B.0481 Econometric Society (ES)"

Société d'économie

Sec. Julius P. Gordon, Department of Economics, Northwestern University, Evanston, IL 60201, USA. T (312) 492 3616.

Founded 29 Dec 1930, Cleveland, by a group of economists, mathematicians and statisticians of various countries, registered in USA as a non-profit scientific organization.

Aims: Advancement of economic theory in its relation to statistics and mathematics, and in particular promotion of studies that aim at a unification of the theoretical and the empirical-quantitative approach to economic problems and that are penetrating by constructive analogies. It is an aim of the Society to make the members' work better known and to dominate in the natural sciences; any activity which promotes ultimately to further such unification of theoretical and factual studies in economics.

Structure The Fellows, who are nominated by the Council and elected by mail vote of the Fellows, represent the highest authority; Council (annual) elected for years by the Fellows. The Officers, who are ex officio members of the Council, are elected by the Council for a period of one year. Meetings open. Staff 4. Languages English, French.

Finance Members: dues (Canada, USA, Europe, Japan, Australia and New Zealand $27; other countries $18. Subscriptions, institutional members. Dues: $250,000. Consultative Status UNESCO (C). Meeting Annually in North America and Europe Madison, Atlantic City and Helsinki 1976, Ottawa, New York and Vienna 1977, Athens and Atlanta 1978, Aix-en-Provence and Denver 1980, San Diego 1981. Publications Econometrica (I, y), Bulletin (1977) Members Individuals: institutional members in 59 countries: Af Algeria, Congo, Ghana, Madagascar, Morocco, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tunisia, Arg Argentina, Bolivia, Brazil, Canada, Caribbean, Chile, Colombia, Costa Rica, Dominican Rep, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Peru, Puerto Rico, USA, Uruguay, Venezuela. As Burma, Hong Kong, India, Iran, Iraq, Israel, Japan, Jordan, Korea, Lao PDR, Lebanon, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, and Australia, New Zealand; Eu Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, Germany FR, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, Turkey, Uk, USSR, Yugoslavia.

"B.11147 International Association for Mathematics and Computers in Simulation (MACS)

Association internationale pour les mathématiciens et calculatrices en simulation et applications. President Robert Vichnevetsky, Dept of Computer Science, Rutgers University, New Brunswick NJ 08803, USA. Secretaries: Amsterdam (The Netherlands), Edmonton (Canada), Aix-en-Provence (France), Athens (Greece), Helsinki (Finland), Budapest (Hungary), Brandenburg (West Germany), Leningrad (U.S.S.R.), London (Great Britain).


Aims: The promotion of scientific and economic exchanges among specialists interested in analog and hybrid computing methods, by organizing international meetings, displays of equipment, by issuing scientific publications and establishing frequent contacts with scientific associations for the study of analogical computation methods.

Structure General Assembly (every 3 years) elects the Board of Directors composed of President, Vice-Presidents, Secretary General, Treasurer, members and consultant (non-voting) members. Technical Committees.

Languages English, French. Finance Members' dues: Individuals $24.00 (several Bel Fr: Associate scientific membership $48.00 (Belg Fr 1,600); Associate Industrial membership $140.00 (Belg Fr 5,000). 1800 members, held in over 100 countries. 12500,000. Publications Mathematics and Computers in Simulation (quarterly) for scientific associations representing the IFAC, Publications of World Computer-Simulation Congresses, and other publications.

"B.81033 Institute of Management Sciences (The) (TIMS)

Institut des sciences de gestion

Exec Dir M R De Melin, 146 Westminster St, Providence RI 02903, USA. T (401) 274 2526.


Aims: Identify, extend and unify scientific knowledge that contributes to the understanding and practice of management.

Structure Council of 18 members elected by the individual members. Standing Committees. President is chief executive officer. Staff 4 paid. Languages English. Finance Members' dues: $320; sales of publications. Budget: $400,000.

NGO Status: Member of International Statistical Institute (ISI). Associate member of International Federation of Operational Research Societies (IFORS). Activities Co-operates with other organizations in the advancement of the practice of management, stimulates research and promotes high professional standards in the development of unified management science.


**D: Regionally defined membership organizations**

- **D1797 International Management Systems Association (IMSA)**
  - **SG Dr Hans Knoepfel**, c/o Inst for Planning, Construction Management, ETH
  - Hoenggerberg, CH-8093 Zürich, Switzerland.
  - Founded 1971. Aims: Act as focus of international activities for the exchange of management systems knowledge and promoting the advancement of management methods, systems and techniques for practical applications. Members National project management associations (7).

- **D5724 Pacific Asia Federation of Industrial Engineering (PAFE)**
  - Federation de l'Asie et du Pacifique des ingenieurs industriels
  - Sec Prof R.M Ramsey, 20 Leonie Hill Flats, Singapore 9, Singapore. T. 37 88 25.
  - Aims: Raise the living standards of people in the Pacific Asian region by encouraging the application of Productivity and Management techniques, notably through increased communication with government, semi-government and similar agencies, internally and externally, among the member countries.
  - Structure: Governing Council (2 representatives per member association) meets every 3 years and elects Vice-President, who is also President-elect. Secretary and Chairmen go with Presidency, by rotation. Languages: English.
  - NGO Relations: World Confederation of Productivity Science (WCCPS).
  - Members: One representative per Association/Institution devoted to the encouragement of industrial engineering productivity and management techniques, representing the national interest, in 5 countries: Australia, India, Malaysia, Singapore, Sri Lanka. Au. Australia.

- **D5699 International Federation for Systems Research**
  - Contact Leonard R Troncale, Inst for Advanced Systems Studies, California State Polytechnic Univ, SAN I W Temple Ave, Pomona CA 91768, USA.

- **D5785 Association of European Operational Research Societies (EURO)**
  - Association des sociétés européennes de recherche opérationnelle.
  - Pree Prof Rolfe Tomlinson, c/o Operational Research Society, Neville House, Waterlo Street, Birmingham B3 7TX, UK.
  - Members National organizations in 15 countries: Ex. Austria, Belgium, Denmark, Finland, France, Germany FR, Greece, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, Turkey, UK.

**F: Organizations having a special form, including foundations and funds**

- **F6154 European Systems Research Institute (ESRI)**
  - Contact: Chaussée de Bruxelles 135, B-1310 La Hulpe, Belgium. T. 657 90 80, T. 23 614.
  - Operates as one of the IBM schools at the Arthur K Watson International Education Centre, and provides tuition for systems engineers and senior administrators.

- **F6730 International Conference on Analysis and Optimization of Systems**
  - Contact: INRIA, Domaines de Voluceau, Rocquencourt, F-78153 Le Chesnay CEDEX, France.

- **F6742 International Symposium on Forecasting**
  - Contact: Mihmim Oral, General Chairperson, Dept of Industrial Engineering General Univ, PK 2, Siasia systems, Turkey.

- **F6804 International Conference on Systems Sciences**
  - Contact Jerzy Swietek, Technical Univ of Wroclaw, Inst of Engineering Cybernetics, Janiszewski St 11/17, 370 Wroclaw, Poland.

**G: Internationally-oriented organizations grounded in a particular country, including bilateral bodies**

- **G5424 International Academy of Management (IAM)**
  - Académie internationale de management
  - Founded 19 Nov 1958, White Sulphur Springs, as section of World Council of Management (WCO).
  - Aims: Provide CISOs members with a consultative organ at the international level for fundamental research in the currently evolving and advancing theories, philosophies, terminologies and practices of management.
  - Structure: Administrative Council composed of Chancellor, Vice-Chancellors and one representative from each CISO Regional Committee. Languages: English, French.
  - Publications: Reports and studies by members.
  - Members individual (160). A maximum of 12 members are elected annually for life.
  - Membership countries not specified.

- **G5426 Association for Systems Management (ASM)**
  - Association pour la gestion de systemes et methodes
  - Exec Dir R L Irwin, 24587 Bagley Road, Cleveland OH 44138, USA. T. (216) 243 7900.
  - Founded 1947, Detroit, as Systems and Procedures Association of America; 1968 n Name changed to Systems and Procedure Association 1981; present name adopted 1968. Aims: Promote the improvement of systems through education, research and exchange of ideas.
  - Members Chapters (136) in 4 countries: Am Canada, Mexico, USA, Venezuela.
  - Total membership 10,000, primarily in USA and Canada.
Fédération internationale de marketing
Aims Foster application of scientific methods and principles in the study and practice of marketing; encourage application of those principles of integrity, ethics, objectivity and a high degree of professionalism in activities in other scientific fields; and international exchange of knowledge and experience in marketing; contribute to the improvement of education in marketing.
Structure General Assembly (G.A.) elected; 2-year term. composed of delegates from member associations, elects Executive Council, consisting of: 3 president, 3 regional vice-presidents, 1 secretary, 1 treasurer, 12 members; President-Elect and 1 member, 2-year term. Languages English, French.
Finance Budget from members’ dues, calculated to cover the expenses of the G.A. and its standing committees. Meetings held in the year of the G.A. in Athens, Greece. Nominations and elections announced in the Publication Bulletin.
Members National organizations in 23 countries: Af South Africa, Am Israel, As India, Korea S. Pakistan, Singapore, South Africa, Br Belgium, Denmark, France, Greece, Ireland, Italy, Netherlands, Norway, Romania, Sweden, Spain, Switzerland, UK.
1981.07.10.

International Mathematical Union (IMU) Union Mathematique Internationale (UMI) Internationale Mathematische Vereinigung — Union Internationale de Mathématiques
See Prof Jacques-Louis Lions, Collège de France, 11 Place Marcello-Berthelot, F-75231 Paris CEDEX 06, France. T. 02.03.11.57.
Pres Prof Lennart Carleson, same address.
Festivals 27-28 Aug. 1982, New York, USA.
Aims Promote international co-operation in mathematics; support and assist the International Mathematical Congresses and other scientific meetings or conferences concerning and support other international mathematical activities considered likely to contribute to the development of mathematical science in any of its aspects — pure or applied — or to education.
Structure General Assembly; Executive Committee. Languages French, English, Russian.
CGRO Members of the Int. Council of Scientific Unions.
1979.10.

International Measurement Confederation (IMEKO) Confederation Internationale de la Mesure — Confederación Internacional de la Medición — Internationale Meßtechnische Konföderation — Meßunionskonferenz für systematische Techniken i Prioborostroenija
Founded 1 January 1958, as the International Measurement Conference — Conférence internationale de la mesure, a Preparatory Committee having been set up 1958, Budapest, at 1st International Measurement Conference. Charter, Constitution and By-Laws approved June 1965, Warsaw, when present name was adopted. Constitution amended 1972 and 1979.
Aims Promote the international exchange of scientific and technical information relating to developments in measuring techniques, instrumentation of measurement in scientific research and in industry; facilitate cooperation among scientists and engineers in studying problems in this field.
Structure General Council (annual), composed of one or two delegates from each member organization. elects Officers: President, Secretary General, Treasurer, 3-year term, Secretary, Deputys, elected by Secretary General, Technical Committees. Languages English, French, German, Russian. Staff 3 paid 1 voluntary. Finance Members’ dues: fixed freely by member organizations between a minimum of US $ 70 and a maximum of US $ 4500 per annum.
Members National scientific and technical societies concerned with measurement science, technology and instrumentation; in 27 countries: Af South Africa, Am Australia, As India, Japan, Korea, South Africa, Br Belgium, Bulgaria, Czechoslovakia, Finland, France, Germany DR, Germany FR, Greece, Hungary, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Portugal, Spain, Sweden, Switzerland, Turkey, USSR, UK, Yugoslavia.

International Institute for Applied Systems Analysis (IIASA) Institut international pour l'analyse des systèmes de haut niveau — raumflunnonlinoling der hoheren Ordnung — Instituto Internazionale per l’Analisi dei sistemi di alto livello
Dir Prof C S Holling, Schloss Laxenburg, A-2361 Laxenburg, Austria, T. (02236) 71521. Tis 079137.
Aims Provide a co-operative and individual research in relation to problems of modern societies arising from scientific and technological development; encourage and assist other international efforts in the fields of systems analysis, cybernetics, operations research and management techniques.
Structure Council of 17 annual, composed of 1 representative from each National Member Organization (NGO), responsible for the activities of NGOs, an NGO Relations Committee, a Board of Directors.
Institutions Conference, Finance Committee, membership Conference, Conference (every 3 years), Languages English, French, Russian, Member NGOs US $ 7 million (approx). External sources (foundations, etc) US $ 1 million (approx).
Activities Contacts with UN, UNIDO. Collaboration with WHA; IAEA. Activities Research on: energy systems; food and agriculture; forestry; research; renewable resources; population dynamics; system and decision sciences; economic structural change; environmental risks and conflicts; regional and urban development. Conferences, seminars, workshops.
Publications NATO Publications (quarterly publications index); Options (quarterly news reports). Research Reports; Research Memorandums (approx. 100 per year). Conference proceedings (approx. 10 per year).
Members National Member Organizations in 17 countries: Af Benin, Am Argentina, Br Brazil, Can, Canada, Colombia, Costa Rica, Mexico, Nicaragua, Panama, Puerto Rico, USA; Venezuela; Afg, China, Iran, Iraq, Israel, Japan, USSR, Australia, New Zealand, Br Belgium, Denmark, Finland, France, Germany FR, Greece, Hungary, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Portugal, Spain, Sweden, Switzerland, Turkey, USSR, UK, Yugoslavia.
1982.09.20.
Appendix 4. Strong to very strong American graduate programs in Operations Research and Industrial Engineering

A RATING OF GRADUATE PROGRAMS IN OPERATIONS RESEARCH
Leading Institutions

<table>
<thead>
<tr>
<th>INSTITUTION</th>
<th>Rank</th>
<th>Score</th>
<th>Curriculum</th>
<th>Faculty Instruction</th>
<th>Faculty Research</th>
<th>Library Resources (Operations Research)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California, Berkeley</td>
<td>1</td>
<td>4.94</td>
<td>4.94</td>
<td>4.95</td>
<td>4.93</td>
<td>4.94</td>
</tr>
<tr>
<td>Columbia</td>
<td>2</td>
<td>4.93</td>
<td>4.93</td>
<td>4.94</td>
<td>4.92</td>
<td>4.93</td>
</tr>
<tr>
<td>Stanford</td>
<td>3</td>
<td>4.92</td>
<td>4.92</td>
<td>4.93</td>
<td>4.91</td>
<td>4.92</td>
</tr>
<tr>
<td>M.I.T.</td>
<td>4</td>
<td>4.91</td>
<td>4.91</td>
<td>4.92</td>
<td>4.90</td>
<td>4.91</td>
</tr>
<tr>
<td>Cornell</td>
<td>5</td>
<td>4.89</td>
<td>4.90</td>
<td>4.91</td>
<td>4.88</td>
<td>4.88</td>
</tr>
<tr>
<td>Michigan (Ann Arbor)</td>
<td>6</td>
<td>4.88</td>
<td>4.89</td>
<td>4.90</td>
<td>4.87</td>
<td>4.85</td>
</tr>
<tr>
<td>Northwestern</td>
<td>7</td>
<td>4.85</td>
<td>4.85</td>
<td>4.90</td>
<td>4.84</td>
<td>4.81</td>
</tr>
<tr>
<td>UCLA</td>
<td>8</td>
<td>4.84</td>
<td>4.83</td>
<td>4.90</td>
<td>4.82</td>
<td>4.80</td>
</tr>
<tr>
<td>Carnegie-Mellon</td>
<td>9</td>
<td>4.81</td>
<td>4.80</td>
<td>4.87</td>
<td>4.78</td>
<td>4.79</td>
</tr>
<tr>
<td>N.Y.U.</td>
<td>10</td>
<td>4.76</td>
<td>4.75</td>
<td>4.83</td>
<td>4.72</td>
<td>4.73</td>
</tr>
<tr>
<td>Case Western Reserve</td>
<td>11</td>
<td>4.71</td>
<td>4.70</td>
<td>4.80</td>
<td>4.68</td>
<td>4.66</td>
</tr>
<tr>
<td>Wisconsin (Madison)</td>
<td>12</td>
<td>4.66</td>
<td>4.66</td>
<td>4.88</td>
<td>4.65</td>
<td>4.64</td>
</tr>
<tr>
<td>Johns Hopkins</td>
<td>13</td>
<td>4.63</td>
<td>4.63</td>
<td>4.85</td>
<td>4.64</td>
<td>4.60</td>
</tr>
<tr>
<td>North Carolina (Chapel Hill)</td>
<td>14</td>
<td>4.62</td>
<td>4.62</td>
<td>4.64</td>
<td>4.63</td>
<td>4.59</td>
</tr>
</tbody>
</table>

A RATING OF GRADUATE PROGRAMS IN INDUSTRIAL ENGINEERING
Leading Institutions

<table>
<thead>
<tr>
<th>INSTITUTION</th>
<th>Rank</th>
<th>Score</th>
<th>Curriculum</th>
<th>Faculty Instruction</th>
<th>Faculty Research</th>
<th>Library Resources (Industrial Engineering)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan (Ann Arbor)</td>
<td>1</td>
<td>4.96</td>
<td>4.96</td>
<td>4.96</td>
<td>4.96</td>
<td>4.97</td>
</tr>
<tr>
<td>California, Berkeley</td>
<td>2</td>
<td>4.94</td>
<td>4.95</td>
<td>4.94</td>
<td>4.94</td>
<td>4.94</td>
</tr>
<tr>
<td>Stanford</td>
<td>3</td>
<td>4.92</td>
<td>4.93</td>
<td>4.92</td>
<td>4.92</td>
<td>4.92</td>
</tr>
<tr>
<td>Purdue (Lafayette)</td>
<td>4</td>
<td>4.90</td>
<td>4.91</td>
<td>4.91</td>
<td>4.89</td>
<td>4.89</td>
</tr>
<tr>
<td>Wisconsin (Madison)</td>
<td>5</td>
<td>4.86</td>
<td>4.90</td>
<td>4.90</td>
<td>4.83</td>
<td>4.81</td>
</tr>
<tr>
<td>Cornell</td>
<td>6</td>
<td>4.83</td>
<td>4.90</td>
<td>4.90</td>
<td>4.79</td>
<td>4.73</td>
</tr>
<tr>
<td>Georgia Tech</td>
<td>7</td>
<td>4.79</td>
<td>4.87</td>
<td>4.89</td>
<td>4.71</td>
<td>4.70</td>
</tr>
<tr>
<td>Northwestern</td>
<td>8</td>
<td>4.75</td>
<td>4.82</td>
<td>4.85</td>
<td>4.68</td>
<td>4.64</td>
</tr>
<tr>
<td>Columbus</td>
<td>9</td>
<td>4.72</td>
<td>4.81</td>
<td>4.82</td>
<td>4.62</td>
<td>4.63</td>
</tr>
<tr>
<td>Ohio State</td>
<td>10</td>
<td>4.69</td>
<td>4.75</td>
<td>4.80</td>
<td>4.58</td>
<td>4.61</td>
</tr>
<tr>
<td>Illinois (Urbana)</td>
<td>11</td>
<td>4.64</td>
<td>4.73</td>
<td>4.76</td>
<td>4.50</td>
<td>4.55</td>
</tr>
<tr>
<td>Iowa (Iowa City)</td>
<td>12</td>
<td>4.60</td>
<td>4.71</td>
<td>4.73</td>
<td>4.44</td>
<td>4.52</td>
</tr>
<tr>
<td>Iowa State (Ames)</td>
<td>13</td>
<td>4.58</td>
<td>4.69</td>
<td>4.71</td>
<td>4.41</td>
<td>4.50</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>14</td>
<td>4.53</td>
<td>4.63</td>
<td>4.68</td>
<td>4.38</td>
<td>4.44</td>
</tr>
<tr>
<td>Texas A&amp;M</td>
<td>15</td>
<td>4.50</td>
<td>4.59</td>
<td>4.65</td>
<td>4.23</td>
<td>4.42</td>
</tr>
<tr>
<td>Penn State (U. Park)</td>
<td>16</td>
<td>4.47</td>
<td>4.54</td>
<td>4.62</td>
<td>4.31</td>
<td>4.40</td>
</tr>
<tr>
<td>Missouri (Columbia)</td>
<td>17</td>
<td>4.44</td>
<td>4.52</td>
<td>4.60</td>
<td>4.28</td>
<td>4.37</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>18</td>
<td>4.40</td>
<td>4.48</td>
<td>4.56</td>
<td>4.22</td>
<td>4.35</td>
</tr>
<tr>
<td>Minnesota (Minneapolis)</td>
<td>19</td>
<td>4.36</td>
<td>4.43</td>
<td>4.50</td>
<td>4.20</td>
<td>4.32</td>
</tr>
<tr>
<td>Oklahoma State</td>
<td>20</td>
<td>4.31</td>
<td>4.39</td>
<td>4.43</td>
<td>4.16</td>
<td>4.27</td>
</tr>
<tr>
<td>Lehigh</td>
<td>21</td>
<td>4.28</td>
<td>4.33</td>
<td>4.38</td>
<td>4.15</td>
<td>4.24</td>
</tr>
<tr>
<td>Kansas State</td>
<td>22</td>
<td>4.24</td>
<td>4.29</td>
<td>4.33</td>
<td>4.12</td>
<td>4.20</td>
</tr>
<tr>
<td>V.P.I. &amp; State U.</td>
<td>23</td>
<td>4.21</td>
<td>4.26</td>
<td>4.30</td>
<td>4.10</td>
<td>4.16</td>
</tr>
<tr>
<td>Florida</td>
<td>24</td>
<td>4.16</td>
<td>4.21</td>
<td>4.23</td>
<td>4.08</td>
<td>4.12</td>
</tr>
<tr>
<td>Auburn</td>
<td>25</td>
<td>4.13</td>
<td>4.16</td>
<td>4.20</td>
<td>4.07</td>
<td>4.10</td>
</tr>
<tr>
<td>SUNY (Buffalo)</td>
<td>26</td>
<td>4.11</td>
<td>4.12</td>
<td>4.16</td>
<td>4.05</td>
<td>4.09</td>
</tr>
<tr>
<td>LSU (Baton Rouge)</td>
<td>27</td>
<td>4.08</td>
<td>4.09</td>
<td>4.12</td>
<td>4.04</td>
<td>4.08</td>
</tr>
<tr>
<td>Syracuse</td>
<td>28</td>
<td>4.07</td>
<td>4.07</td>
<td>4.10</td>
<td>4.03</td>
<td>4.06</td>
</tr>
</tbody>
</table>