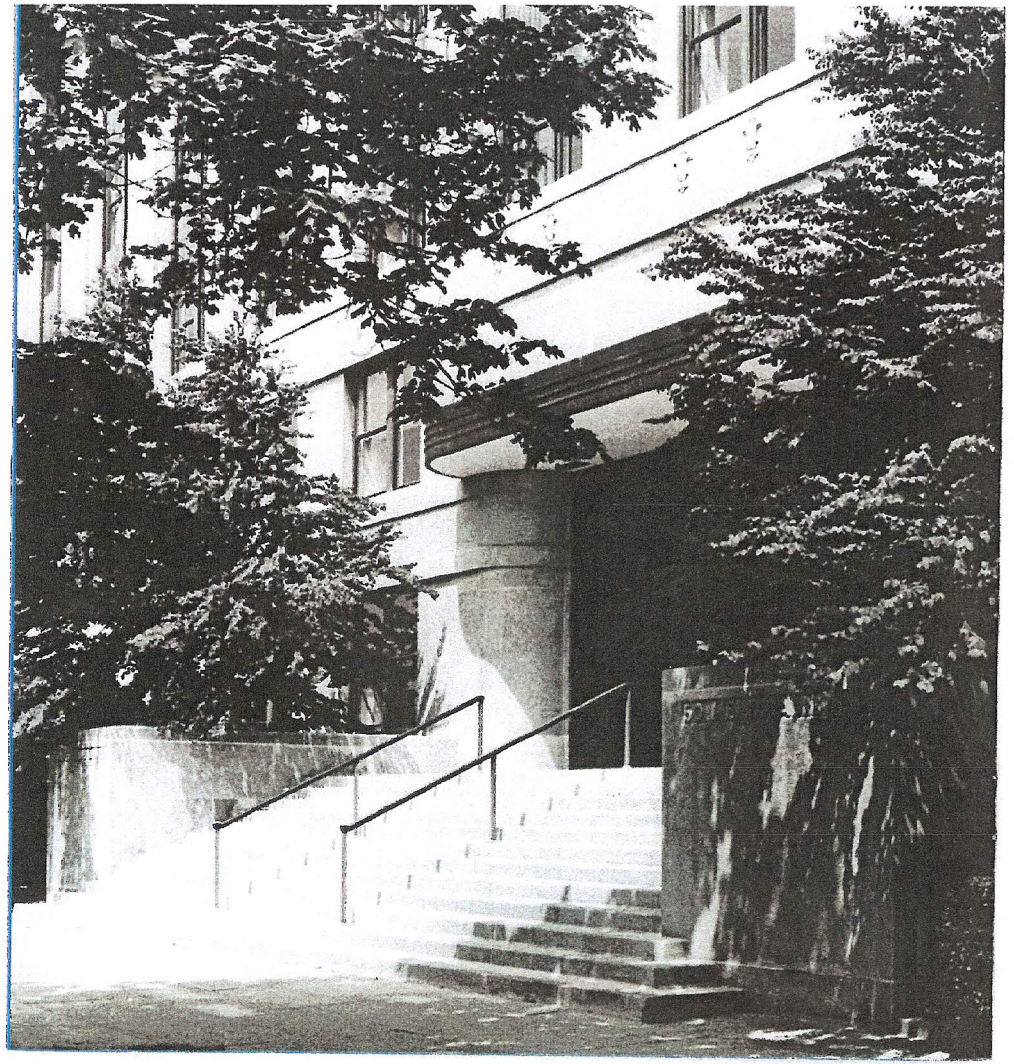
# Management Information Systems

Sloan School
of
Management

Massachusetts
Institute
of Technology



# Objectives

The principal objective of the Sloan School's Management Information Systems Group is to provide education and research addressing the information needs of management in both the public and private sectors in today's environment.

This environment includes:

An increasingly complex society, a more service-oriented society, and a world of limited resources.

Increasingly rapid advancements in information handling technologies (e.g., data base systems, graphics, micro-computers).

An increasing gap between the information handling technologies available to management and the effective use of those technologies.

Within this environment, our plan is to continue to focus on the evaluation, implementation, and technical design of computer-based information systems and on understanding both the organizational implications of information systems and the decision-making process. In response to this environment, we endeavor to develop:

Better information handling tools for management through application driven research.

Educational programs for students to better equip them to become future managers, and for existing managers to close the gap between available technologies and the ones in use.

In-depth and transmittable expertise in both advanced management issues and applicable technologies.

Mutually cooperative links to the corporate and public sectors in which we can be recognized as being responsive to their needs.

Figure 1 Components of MIS

| Faculty Backgrounds | Students | Research (applications driven—0 to 5 years) energy, health, corporate | Center for Information Systems Research (CISR) | Subjects Taught | Relationships with Other Groups |
|---|---|---|---|---|---|
| Computer Science | Masters | Database Systems | Research | Programming | Management Science |
| Engineering | Doctoral | Distributed Processing | Seminars | Systems Software and Hardware | Economics |
| Law | Undergraduate | Decision Support Systems | Working Papers | Database Systems | Public Policy |
| Management | Special Students | Security and Privacy | Sponsoring Organizations | Telecommunications | Computer Science |
| Mathematics | Senior Executives | End Uses | Dissemination | MIS Implementation and Organizational Impacts | Functional Fields |
| | Urban Executives | Composite Systems | | Decision Support Systems | |
| | Sloan Fellows | Software | | Simulation | |
| | | Microcomputers | | Computers and Law | |

# Important Components of the MIS Group

## Faculty

Professor Michael S. Scott Morton
Associate Dean

Professor John J. Donovan and
Professor Stuart E. Madnick

Figure 1 outlines the components that are being brought to bear to fulfill our objectives.

The MIS faculty gains unique strength from diverse and multi-disciplinary backgrounds in fields including management, computer science, and law.

Robert M. Alloway, D.B.A., Harvard University
Project selection, management, and implementation processes for computer based systems.

Peter P. Chen, Ph.D., Harvard University
Information systems, data base management, models of computer systems.

John J. Donovan, Ph.D., Yale University
Data base systems, applications in public and private policy decision making including energy, health, corporate.

Richard A. MacKinnon, M.B.A., Harvard University
Data processing management, operating systems.

Stuart E. Madnick, Ph.D., MIT
Technological foundations to computer based information systems, applied computer science, data management.

William A. Martin, Ph.D., MIT
Knowledge based systems, automatic programming, information systems.

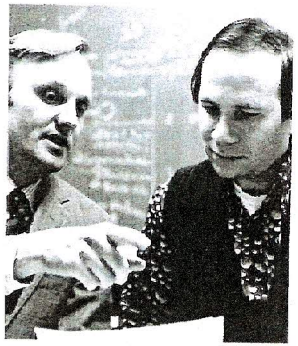
Jeffrey A. Meldman, J.D., Harvard University; Ph.D., MIT
Information systems and law, privacy and security, information systems models.

John F. Rockart, Ph.D., MIT
Distributed processing, planning and control in nonprofit organizations.

Michael S. Scott Morton, D.B.A., Harvard University
Decision support systems, planning and control.

Hoo-Min D. Toong, Ph.D., MIT
Microprocessors, use and methodology.

Michael D. Zisman, Ph.D., University of Pennsylvania
Office automation, information systems, data base systems.



## Students

One of the strongest resources that the MIS group has to draw upon is the existing and continuously improving student-base within the school. The students within the MIS group range from those with considerable practical business experience to those with highly technical backgrounds, and from those with strong disciplinary backgrounds to those with broad liberal arts backgrounds. There is close interaction between faculty and students at all levels—undergraduates, masters candidates, and doctoral candidates. The faculty also participate in special student programs offered by the Sloan School including the Senior Executives Program, the Urban Executives Program and the Sloan Fellows Program.

## Research

William Pounds, Dean of the Sloan School of Management, has stressed the importance in management education of direct, in-depth participation in the application of advanced methods of analysis and problem solving to important issues. Accordingly, the research of the MIS group is:

Application driven: we address important problems of today (e.g., energy), examine the methodologies and tools, and evaluate their effectiveness for these areas. We work to advance existing technologies only when we find that they are presently inadequate.

Oriented to the near future: most of the research is intended to have applicability within five years.

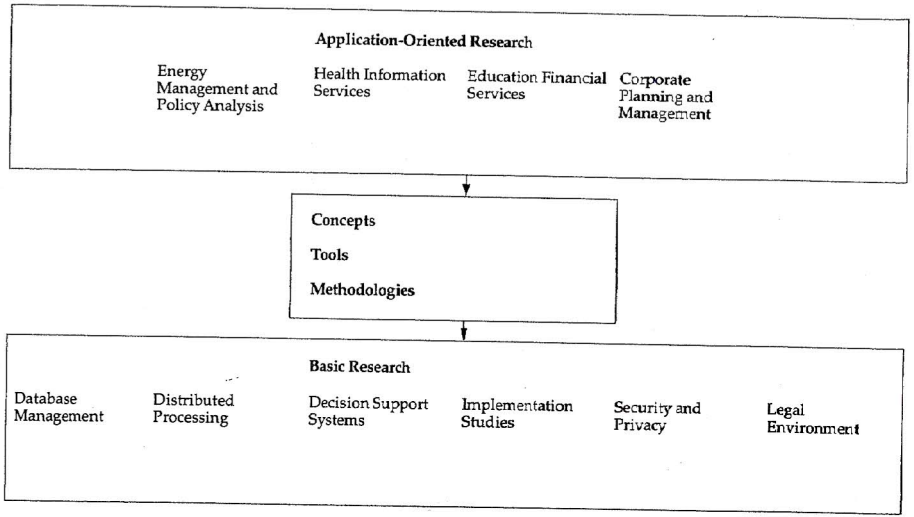
Chosen according to its potential for contribution of fundamental knowledge to the field.

Undertaken with student and faculty participation: it provides both to students and to faculty a continuously updated experience with advanced tools and methods. This experience is reflected back into the classroom.

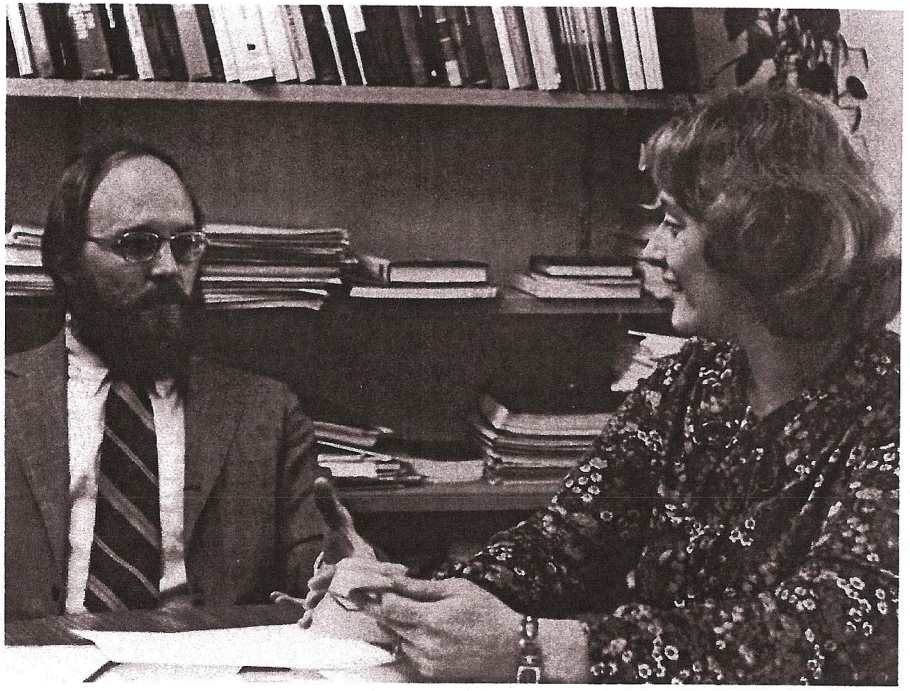
Reviewed continuously by internal groups, sponsoring organizations, and the public, private and academic sectors.

Figure 2 depicts the structure and major components of the MIS group's research. Research areas shown at the top of the figure are application oriented. Current projects include development of the New England Energy Management Information System and of an early warning system for birth-defects. The concepts, tools, and methodologies examined in application settings like these provide the driving force for basic research efforts in data base systems, distributed processing, security, etc., as shown along the bottom of the figure.

Figure 2 Components of Research

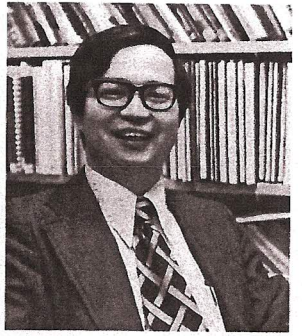


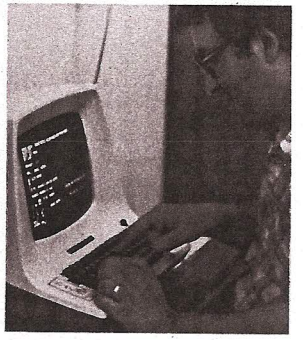
Professor Robert M. Alloway and Chris Bullin,
Program Technical Director



Professor Peter P. Chen

# Center for Information Systems Research (CISR)





The Center for Information Systems Research (CISR) is an organizational unit of the MIS group which provides a strong link with the corporate world and research settings. CISR is comprised of the MIS faculty (in both teaching and research capacities) and several staff members. Its principal objective is to provide ongoing contact with information systems practice and developments in private and public sector organizations. This is done by means of faculty and student involvement with information systems departments and personnel through research projects and seminars.

CISR's efforts are partially funded by federal and state research grants from organizations such as the Naval Electronics Systems Command, the Air Force, and the Veterans Administration. A major factor in intellectual and fiscal support of its activities, however, comes from CISR's "sponsoring organizations"—now 14 in number. Although a few of the Center's sponsors are in the computer industry, by far the majority are major organizations which utilize computers—and are looking to bring additional research-based perspectives to bear on their computer operations.

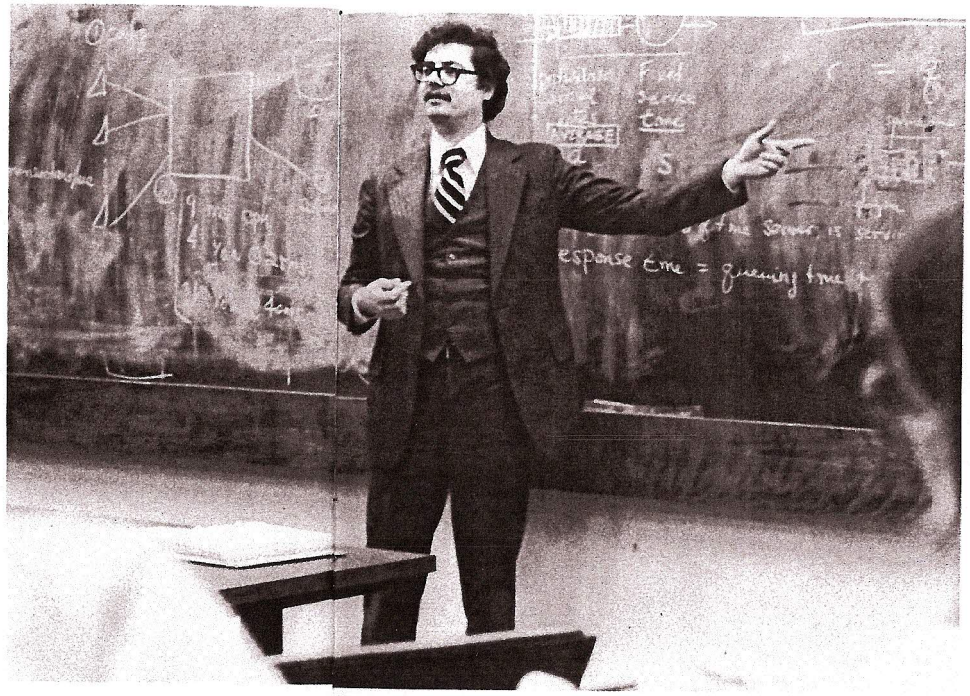
CISR draws upon the entire spectrum of teaching and research activities of the MIS group in its research and seminar program. In excess of 150 students have been involved in various aspects of the research of the Center since it was initially established in mid 1974.

# Subjects Taught

The MIS group is concerned with understanding the organizational implications of information systems and the management decision-making process as well as the technical design, evaluation, and implementation of computer-based information systems. To this end, the subjects offered address issues involved in the realization of effective information systems, including the hardware and software issues, the MIS design process, systems analysis, behavioral and organizational impacts of information systems, and the development of formal models relevant to the information systems area.

As a result of the increasing importance of and dependence upon this field, recent graduates have had opportunities in high-level consulting positions and other entrepreneurial activities, as well as in university faculty positions.

The MIS group offers two alternative programs of subjects. One program provides a general exposure to the field for the manager who wishes to understand the MIS potential and effectively communicate with MIS professionals. The other program provides a more detailed technical and managerial background in MIS for those who wish to have major MIS responsibilities, in a planning, design, or implementation role, as well as for those who wish to pursue their doctorates in MIS. In either program, the student develops a solid foundation in management through the other required and elective subjects of the Sloan School degree programs.



Professor Jeffrey A. Meldman

## General Exposure Program

**Benchmark Computer Programming (15.561)**
Introductory computer concepts in hardware and software. Specific emphasis on developing a competent programming ability in high-level languages, primarily BASIC and PL/1. (This course, or equivalent background, is required for all Sloan Master's students.)

**Principles of Management Information Systems (15.562)**
Introductory examination of issues related to the effective use of computer-based information systems in organizations. Topics include a brief overview of management information technology (computer systems, database management), frameworks for the analysis and design of different types of information systems in an organization, methodologies for assuring satisfactory implementation, and factors affecting effective system use in management.

**Three Core Subjects:**

**Management Information Technology I** (15.564)
Introduction to the technical concepts common to all computer usage: computer hardware structure, machine language programming, table and list processing, searching and sorting, assemblers, compilers, and operating systems. Emphasis is on program planning and organization. Students are required to prepare and test several programs written in System/370 Assembly Language and PL/I.

**Management Information Technology II** (15.565)
Solid technical background in the concepts essential to the analysis and design of computer-based information systems: data management software techniques, telecommunications, and performance evaluation. Examples of the implementation and use of actual management information systems are discussed.

**Management Information Systems** (15.568)
Emphasis on an understanding of the information system in the context of managerial use and organizational implications. Topics include information-based theories of management, determination of information system needs of the organization, cost/benefit analysis of alternative approaches, systems analysis, and approaches to successfully integrating an information system into an ongoing organization. Lectures and case studies.

**Plus One or More of the Following Subjects:**

**Decision Support Systems** (15.569)
Focus on methods of supporting unstructured decisions. Decision analysis and techniques of model building that involve a manager's internal heuristic model, the use of interactive graphics terminals to support such decisions. In-depth illustrations from systems currently being used in real-world organizational settings.

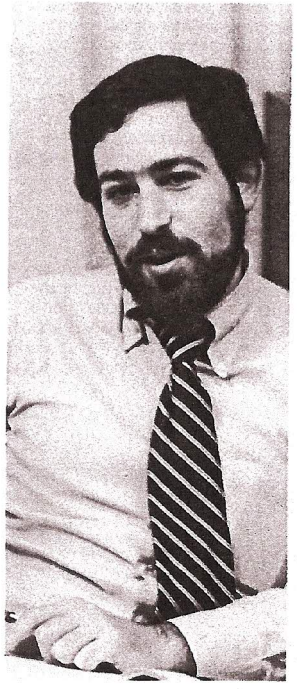
**Advanced Computer Systems** (15.571)
Seminar in advanced computer systems, with emphasis on operating system software and real-time applications. A unifying resource management framework is used to integrate selected case studies and relevant formalisms. Projects and computer assignments.

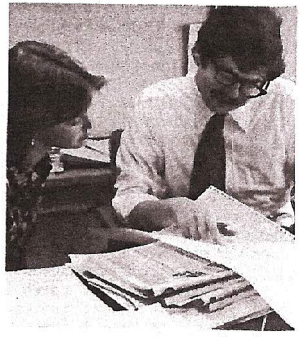
Professor Michael D. Zisman

Professor Jeffrey A. Meldman

**Systems Simulation** (15.572)
An introduction to the use of computers for discrete simulation and model building. Topics include consideration of experimental design, statistical analysis of results, effects of random number generation techniques and validation. Several assignments using computer simulation techniques.

**Information Systems and Law** (15.581)
Examination of interlocking technological and legal issues arising out of the operation of computer-based systems in society. Topics include privacy and security, legal protection of software, and jurimetrics. Readings, discussions, and projects together with law students.





# Relationships with Other Groups

Professor Hoo-Min D. Toong

MIT has 8,000 students organized into five schools. The Sloan School of Management is a closely knit group of 500 students (undergraduate, masters, Ph.D., Senior Executives, Urban Executives, Sloan Fellows) and 80 faculty members. MIS is one of the disciplinary subgroups within the management science group of the Sloan School.

A history of the Sloan School of Management would begin in 1914, when MIT pioneered in organizing a curriculum combining management and engineering education. A master's degree program has been offered since 1925. A major grant from the Sloan Foundation made possible the creation of the Sloan School of Management in 1952. The Sloan School has continued to support the tradition stated by MIT's founder, William Barton Rodgers: "This institute is committed to the dignity of useful work."

The Sloan School of Management's principal objective is the education of future managers and decision makers who will deal with problems in a rapidly changing world. In support of that objective, the management science group's focus is on a wide set of tools including operations research, modeling, marketing, management information systems, accounting. The focus is on both the advancement of these tools and on the education in their use.

As the important problems facing the world today seem to be both managerial and technical, the position of the MIS group within MIT with its

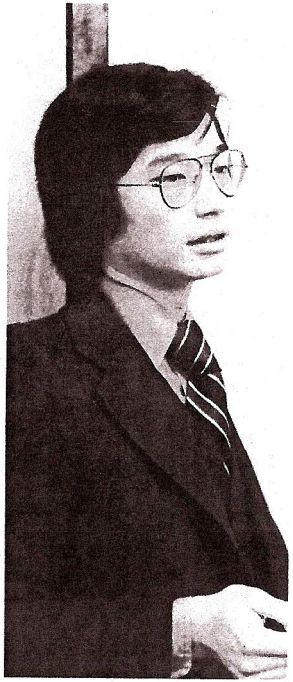
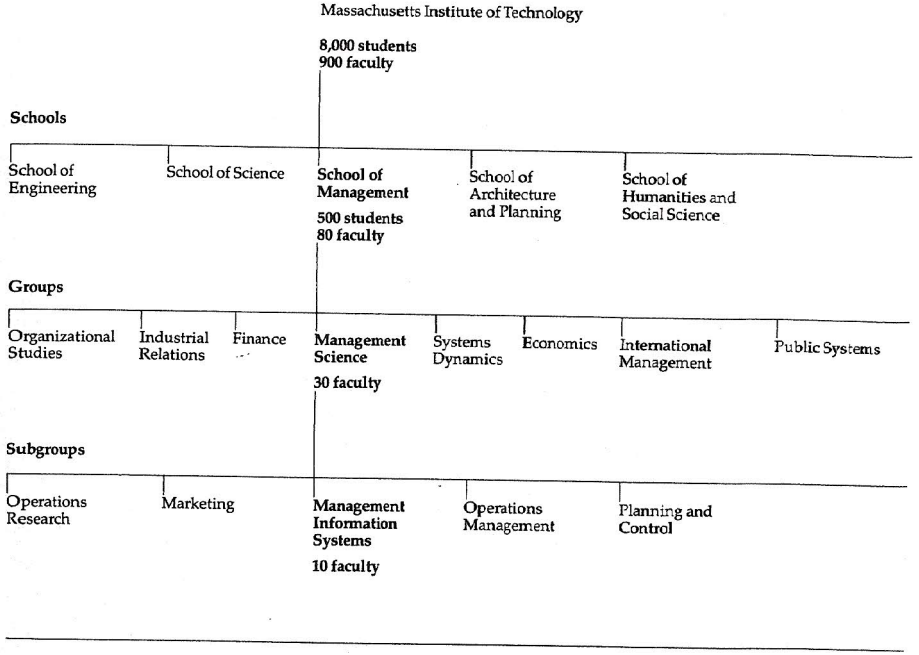


Figure 3 Place of MIS within MIT



## Additional Relationships

Professor John F. Rockart
Director, Center for Information Systems Research

strong technical base and within the Sloan School with its strong managerial base has been particularly advantageous to us. Being a subgroup of the management science group has allowed us to integrate many of the other management science technologies (e.g., operations research, modeling, linear programming, planning and control) with the MIS's information system technologies.

Because of the application focus of much of the research and because of the interdisciplinary nature of the methods needed to address these applications, the faculty, students and staff of the MIS group have also developed close working relationships with other groups at MIT, most notably the Applied Economics group, the Public Policy group, the MIT Energy Laboratory, and the Laboratory for Computer Science.

In addition to the academic programs listed earlier, there are a variety of other possible relationships with the MIS group, including:

**Summer Programs**
Faculty in the MIS area offer one- or two-week intensive summer programs. These include: Computer-Based Information System Technology—data base systems, telecommunications (15.65s); Advanced Software Concepts—Operating Systems (15.25s); Current Research Topics in Information Systems. For additional information contact Professor Jim Austin, MIT Summer Programs.

**CISR Sponsoring Organizations**
CISR membership provides an opportunity for an organization and the MIS group to work together to explore mutually interesting issues together with a mechanism for dissemination of the MIS research results. For additional information, contact Dr. Jack Rockart, Director, CISR.

**Research Sponsors**
Industry and government are encouraged to sponsor MIS research projects. For additional information contact the faculty member in your area of interest.

Photographs by Sid Huff