
MELS

**MICROELECTRONIC &
INFORMATION SCIENCES
CENTER**



**INSTITUTE OF TECHNOLOGY
UNIVERSITY OF MINNESOTA**
227 Lind Hall/207 Church Street S.E.
Minneapolis, Minnesota 55455
(612) 376-9122

Purpose

The Microelectronic and Information Sciences Center was established as a joint endeavor between the University of Minnesota's Institute of Technology and Minnesota industry. Its concepts and objectives were established collaboratively by top executives from major corporations and public agencies and by University faculty and administrators.

The major objectives of the MEIS Center are to advance microelectronic and information sciences through:

- sponsoring and conducting research at the frontiers of microelectronic and information sciences;
- strengthening the educational offerings of the University of Minnesota in these sciences;
- providing active interplay between those seeking discovery and those making application.

The MEIS Center is an interdisciplinary organization based on collaboration among MEIS partners. It is dedicated to research, education and technology transfer in the microelectronic and information sciences and grounded on the philosophy that in a rapidly advancing technological environment, university-industry collaboration is basic to achieving these goals.

Interdisciplinary

The MEIS Center's programs reach across several departments in the Institute of Technology. They involve graduate and undergraduate students and faculty whose research is both basic and applied. Because of this diversity, the MEIS Center has created crosslinking mechanisms between departments in the Institute of Technology and between the University and industry. Also because of this diversity and collaboration, the MEIS programs offer enormous potential for synergistic collaboration between the University and industry, as well as government.

The MEIS Center's interdisciplinary focus weaves together and strengthens the intellectual fabric of microelectronic and information sciences at the University of Minnesota. It does this through research, educational and technology transfer. The strength of MEIS programs is based on the achievement of excellence in all disciplines contributing to the microelectronic and information sciences and on the synergy which stems from collaboration among participating partners.

The interdisciplinary programs of the MEIS Center are implemented through:

- peer reviewed research programs;
 - cooperation among academic departments in conducting research and in educating graduate students; and
 - recognition by the Institute of Technology and the University of Minnesota administration of the importance of interdisciplinary research and education for the achievement of academic excellence and relevance in science and technology.
-

MEIS

Disciplinary advances stemming from interdisciplinary programs are channeled back into disciplinary and departmental activities. These advances contribute to vitality in the disciplines and excellence in departmental programs by focusing on state-of-the-art science and technology and by directing research efforts toward scientific problems which underlie technological developments.

Synergy

The MEIS Center provides an organizational structure which helps create and sustain the ongoing research efforts of the MEIS Center in the following ways:

- attracting visiting researchers from other institutions to participate in the programs of the MEIS Center;
 - providing state-of-the-art training in the microelectronic and information sciences for scientists and engineers, producing new degree recipients, and providing education for professionals already on the job;
 - establishing and maintaining state-of-the-art laboratories in the microelectronic and information sciences; and
 - maintaining an effective vehicle for collaboration and communication among industry, university, and government to facilitate the transfer of technology and science.
-

Research Programs

Major research programs at the MEIS Center include five broad areas of basic, focused and seminal research:

- physical science supporting microelectronics;
- microelectronic circuit design;
- information systems architecture;
- software engineering; and
- information sciences applications.

Resources for MEIS-related research programs are optimized through a program of seeding and matching funds. Research sponsorship from the MEIS Center is used to attract support from federal research agencies, and funds from the state of Minnesota are used to attract private sponsorship.

Faculty who participate in MEIS programs retain their appointments in academic departments. MEIS programs offer faculty opportunities to expand their individual research interests and to collaborate through team research. Faculty and graduate students at the University of Minnesota affiliate with MEIS programs because of the opportunities to work with other high quality professionals, to contribute to a targeted science and technology effort, to increase research funding and obtain access to adequate research facilities and equipment, and to benefit from the intellectual synergy of the MEIS Center's interdisciplinary programs.

Educational Programs

MEIS educational programs are directed toward undergraduate students, graduate students and practicing engineers, as well as toward public understanding of the basic capability and consequences of the new technologies.

Advanced undergraduate and graduate students study microelectronic and information sciences through coursework offered in several departments. Graduate students are sponsored in their studies and research by the MEIS fellowship program and by research assistantships with faculty who are conducting research in MEIS related areas. A cable television program broadcasts many of the MEIS related courses, making them available for practicing scientists and engineers in the surrounding area.

The nature of science education requires that students receive training in both the concepts of science and in the laboratory skills necessary for technology. The MEIS Center's special laboratories provide facilities for faculty research, as well as for student training and service to industrial researchers in the area. The MEIS Center supports several such laboratory facilities:

- Very Large Scale Integration Laboratory
- X-Ray Beamline Laboratory (also supported by Argonne Research Labs)
- Microelectronics Laboratory (also supported by Corporate Affiliates of the Electrical Engineering Department)

Quality education in science also depends on faculty who must keep up with the latest knowl-

edge in the subjects they are teaching. The MEIS Center encourages faculty to stay on the cutting edge by enabling them to talk with industrial and academic colleagues, to maintain familiarity with the transfer of technology into the community, and to conduct state-of-the-art research. A superior science education can only be accomplished when all three resources—quality faculty, quality facilities and quality students—are present together in sufficient supply.

The MEIS Center has sponsored the addition of courses at the upper division and graduate levels. These courses are offered through departmental curricula and have expanded programs of study which are directed toward microelectronic and information sciences.

Also through MEIS sponsorship, new faculty members have been added to departments affiliated with the MEIS Center. These new faculty have brought with them research and instructional expertise which has enhanced the offerings in microelectronic and information sciences at the University of Minnesota.

Technology Transfer

Technology transfer is a two-way process. Results from MEIS sponsored research are disseminated among academic, industrial and governmental colleagues through MEIS technical reports, through graduates who join the work force, and through direct interaction among MEIS related faculty and scientific personnel from industry.

Through these three avenues, new methodological approaches, new analytical techniques and new conceptual designs are exchanged. Needs for

new knowledge and techniques are communicated to faculty scientists. The research which addresses those needs is conducted in the context of the graduate education programs. Results of that research are conveyed to the governmental and industrial sectors by faculty and by graduates who, through their interactions with colleagues, provide new inputs for research needs of the future.

Because communication between scientific colleagues is a key element of research, education and technology transfer, the MEIS Center helps stimulate such communication through a seminar series, through a series of publications, and through workshops. These programs help to identify areas for potential collaboration and provide information on MEIS affiliated programs.

Sponsorship

Four corporations initiated sponsorship of the MEIS Center with gifts of \$6 million, designated to begin building the microelectronic and information sciences program in the Institute of Technology through the MEIS Center:

- Control Data Corporation
- Honeywell, Inc.
- Sperry
- 3M

Sponsorship for the MEIS Center and its programs currently exceeds \$10 million and comes from industrial grants and equipment gifts, from University of Minnesota allocations, from federal

grants and contracts, and state funding.

These funds have enabled MEIS initiatives in research, education and technology transfer. These new initiatives are building upon the Institute of Technology's strengths and its interactions with related programs at the University of Minnesota.

MEIS programs have been established through a sequence of research seeding, faculty expansion, curriculum development, research matching, and facilities expansion. Additional resources have been strategically added at points of optimum return—based on approved program direction defined through faculty collaboration with industry scientists, potential for resource expansion and, importantly, capacity to produce graduates in priority technical areas.

Representatives from sponsoring organizations participate with University faculty and administrators in the following decisions:

- the MEIS Center's organization and management, through the Management Board;
- the award of funds for research grants, through the Technical Coordinating Committee;
- the award of fellowships, the design of seminar series, the development of new research programs, and the placement of student interns and graduates, through committees.

This collaboration has been critical in establishing networks for professional dialogue and in directing the development of MEIS-sponsored programs toward their points of greatest impact. The MEIS Center's programs are bringing people together to achieve excellence in advancing the microelectronic and information sciences.

For further information on the MEIS Center or its programs, contact

Microelectronic and Information Sciences
Center

Dr. Martha Russell, Executive Director
University of Minnesota

227 Lind Hall, 207 Church Street S.E.
Minneapolis, MN 55455

November, 1983
