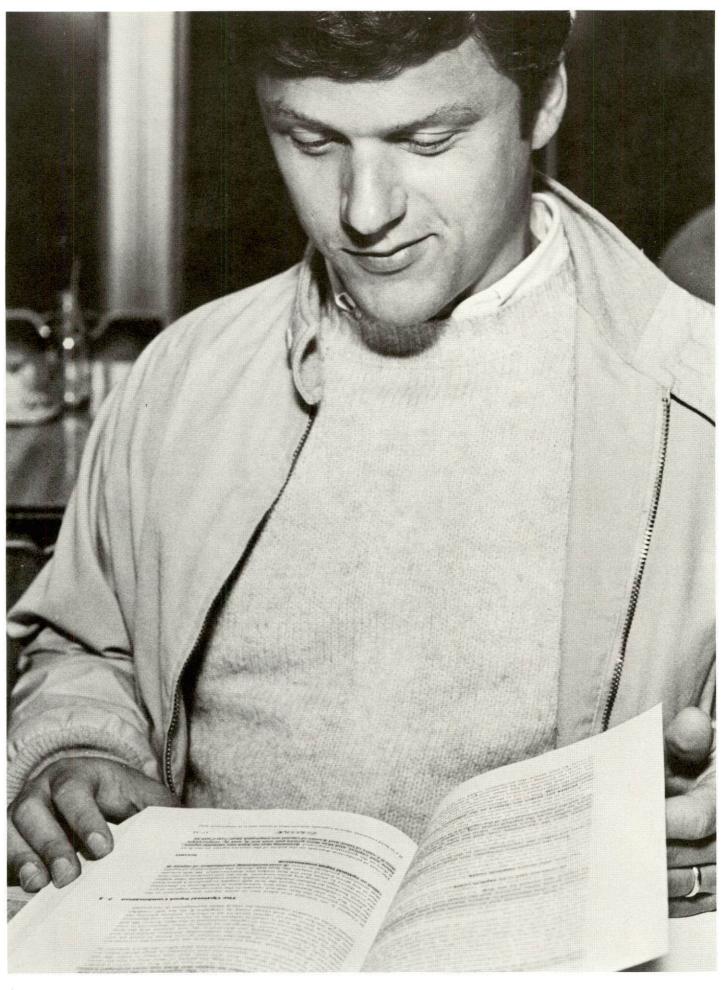
# MASTER OF SCIENCE IN COMPUTER SCIENCE

**GRADUATE PROGRAMS** 

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## **GRADUATE ACADEMIC CALENDAR**

Jun	SUMMER e 7, 1982 throi	SESSION ugh July 23, 1982	Janua	SPRING S ry 24, 1983 th	EMESTER rough May 13, 1983
1982			1983 January		
<b>May</b> 10-14	Monday- Friday	Summer School Registration	20	Thursday	Registration and orientation- for new students on campus.
June	3		21	Friday	Deadline for incompletes from
3	Thursday	Registration and orientation			Fall, 1982.
	27	for new students on campus.	22*	Saturday	GMAT given at Marist.
7	Monday	Classes begin.	24	Monday	Classes begin.
14	Monday	Last date for late registration, change of courses or full tuition refund for withdrawals.	28	Friday	Last date for late registration or change of courses. Half tuition refund after this date.
21	Monday	Last date for withdrawal with	February		
		½ tuition refund.	11	Friday	No tuition refund after this
23	Wednesday	GMAT given at Marist.			date.
28	Monday	Last date for dropping courses	March		
July		without penalty of failure.	4	Friday	Last date for dropping courses without penalty of WF grade.
5	Monday	HOLIDAY. Classes normally meeting this day to meet on	11	Friday	Final draft of the Psychology thesis due.
		Friday, July 9.	14-18	Monday-	Spring Recess.
19-23	Monday- Friday	Final examinations.	19*	Friday Saturday	GMAT given at Marist.
	6 11 21	through September 6	April 1	Friday.	Holiday
			1-4	Friday - Monday	No classes.
	FALL SE	MESTER	5-8	Tuesday- Friday	Registration for Summer and Fall 1983.
Septembe		ugh December 20, 1982	27	Wednesday	7th Annual Community Psychology Conference Day.
1982			May		Andrew Maria and Andrew Maria
September		Section 10 Marin 114 Section 10 Marin 114 Section 10 Marin 114 Section 114 Sec	9-13	Monday-	Final examinations.
2	Thursday	Registration and orientation	21	Friday	Thibte consth
7	Tuesday	for new students on campus. Classes begin for MBA, MPA students.	21	Saturday	Thirty seventh Commencement.
14	Tuesday	Last date for late registration		SUMMER SE	SSION 1983
	<b>,</b>	or change of courses. Half tui- tion refund after this date.	June		
28	Tuesday	No tuition refund after this	2	Thursday	Registration and orientation
	J	date.			for new students on campus.
October			6	Monday	Classes begin.
18-19	Monday- Tuesday	HOLIDAYS	13	Monday	Last date for late registration, change of courses or full tui-
23*	Saturday	GMAT given at Marist.			tion refund for withdrawals.
26	Tuesday	Last date for dropping courses without penalty of WF grade. Service charges as-	20	Monday	Last date for withdrawal with half tuition refund. Deadline for incompletes for Spring
		sessed on unpaid balances as	1		1983.
		of this date.	22*	Wednesday	GMAT given at Marist.
November			27	Monday	Last date for dropping courses
8-12	Monday-	Registration for Spring 1983			without penalty of WF grade.
	Friday	for current students.	July 4	Monday	HOLIDAY. Classes normally
24-28	Wednesday Sunday	- Thanksgiving recess.			meeting this day to meet on Friday, July 8.
December	Junuay		18-22	Monday.	Final examinations.
14-20	Tuesday- Monday	Final examinations.	10.22	Friday	, mai chammadons,
			* Tent	ative date, subje	ect to change at time
Recess	from December	21 through January 23	of appl	ication to Educa	ntional Testing Service.

## **Marist College**

Overlooking the Hudson River immediately north of Poughkeepsie, New York, Marist College is a private, non-sectarian liberal arts institution for men and women.

Undergraduates can earn a Bachelor of Arts degree in one of fourteen majors, a Bachelor of Science degree in one of seven majors, or a Bachelor of Professional Studies. Undergraduate enrollment is about 2000 full-time students; of these, almost one-half are majoring in business, accounting, economics and psychology.

Marist College traces its beginnings to 1905 with the arrival of the Marist Brothers in Dutchess County, New York. Settling on the east bank of the Hudson River in Poughkeepsie, the Brothers established their novitiate, St. Ann's Hermitage, on two adjacent riverside estates.

In 1929, the Marist Brothers established a two-year teacher-training institution on the site of the present campus. A four-year undergraduate curriculum for men was established in 1946, and in 1950 New York State granted the College a permanent charter. Lay students were first enrolled in 1957, and during the next decade the ownership of both land and facilities was transferred from the Marist Brothers to the Marist College Educational Corporation. Today all assets are supervised by an independent Board of Trustees which is responsible for the management of College operations.

## **Growth Of The College**

To accommodate a student body which has increased some 500 percent in the past 10 years, Marist undertook a building program during the 1960's which provided the College with a physical plant valued at more than \$40 million. The campus consists of 100 rolling acres lying 70 miles north of New York City between Route 9 and the Hudson River.

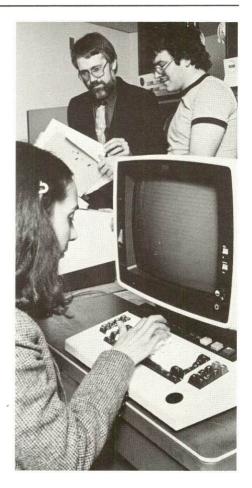
Fifteen buildings have been constructed in the past twenty-five years to respond to the growth of the College. Five dormitories, a major classroom facility, the James J. McCann Recreation Center, and the Library complex are some of the more recent additions to the Marist Campus. Twenty-one new townhouses provide residence for members of the senior class.

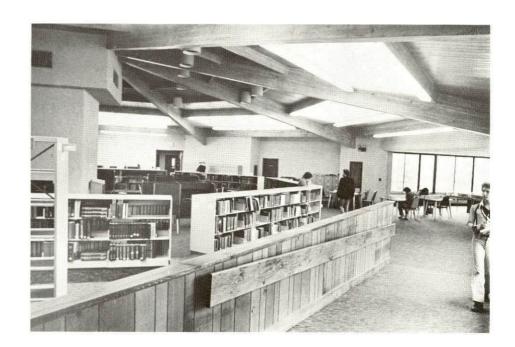
#### **Graduate Programs**

Graduate programs in business administration and in psychology were instituted in 1972 when the State of New York authorized Marist to confer the degrees of Master of Business Administration and Master of Arts in Psychology. In 1979, a graduate program leading to the degree of Master of Public Administration was established.

Almost 300 adults are pursuing master's degrees at Marist with 30 students attending on a full-time basis. MBA Program Extension Sites have been operating at various locations in the Mid-Hudson Valley area for over seven years. Currently, Extension Sites exist in Kingston, Middletown and Fishkill.

Marist College has expanded its graduate program offerings by adding a Master of Science (M.S.) degree in Computer Science.





# The Graduate Program in Computer Science Master of Science (M.S.) Degree

John E. MacDonald, Jr., Ph.D., Director

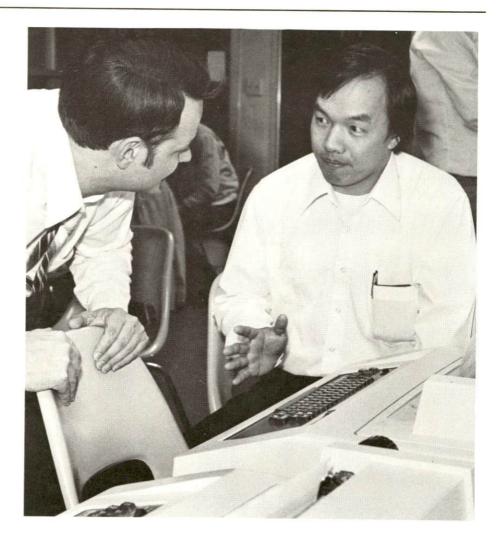
The purpose of the master's degree is to provide advanced training and experience in the various disciplines of computer science to individuals who hold a bachelor's degree in computer science, mathematics, physics, engineering, or some other closely allied field.

A natural extension of the undergraduate program, Marist's M.S. in Computer Science is designed to prepare individuals for a working career in industry or government as well as to assist those who are already employed within the industry to acquire advanced professional training necessary in today's rapidly changing technological environment. This latter group consists of applications programmers, design engineers, managers, materials scientists, manufacturing specialists, field engineers, test specialists, and others who wish to broaden their understanding of the computer science field.

#### **Admission Requirements**

A baccalaureate degree from an accredited college or university is required for admission to the graduate program in computer science. In addition to filing a formal application, each student must:

- Arrange to have official transcripts of all undergraduate (including two-year colleges) and graduate academic records sent to the Director of Graduate Admissions.
- Submit evidence of satisfactory completion of certain undergraduate courses in computer science and mathematics. (Applicants whose undergraduate major is in a field other than computer science should refer to the section on Mathematical/Computer Science Competency.)
- Foreign applicants are required to submit scores on the Test of English as a Foreign Language (TOEFL). Documentation of financial resources and support is also required of all foreign applicants.



Applications for admission may be obtained through the Graduate Admissions Office located in Donnelly Hall, Room 200. All correspondence should be addressed as follows:

> Director of Graduate Admissions Marist College Poughkeepsie, New York 12601

Students are accepted for all semesters—Fall, Spring and Summer. Application for these semesters should be completed by August 15, January 15 and May 15, respectively.

## **Transfer Credit**

A student may transfer up to six (6) graduate credits from a regionally accredited graduate program. Only courses with grades of "B" or better will be accepted. Courses should be equivalent in content and credit value to courses offered in the Marist Program. The Director of the M.S. Program will determine the status of all applications which include previous graduate study.

#### Advisement

The Program Director serves as the advisor for all students in the M.S. Program, and students should discuss any questions or concerns they may have about their studies with the Director.

## MATHEMATICAL/COMPUTER SCIENCE COMPETENCY

It is expected that all applicants for admission to the M.S. Program in Computer Science will have demonstrated proficiency in programming and mathematics. Each student's academic record will be carefully reviewed to assure that this level of proficiency has been reached.

UNDERGRADUATE PRE-REQUISITES: At least two Programming Languages (APL, ASSEMBLER, PASCAL, FORTRAN, PL/I, etc.)	CREDITS 6
Computer Organization	3
File Processing	3
Data Structures	3
Operating Systems and Computer Architecture	$\frac{3}{18}$
Calculus	6
Linear Algebra	3
Probability and Statistics	$\frac{3}{12}$

**TOTAL: 30 credits** 

Formal admission to the master's degree program will only be granted to students who have satisfied these prerequisites. Some students may, however, be permitted to enroll in graduate courses as a non-matriculated student upon satisfactory completion of specific prerequisites. The maximum number of graduate credits that can be earned by a non-matriculated student is *nine*. Questions concerning mathematical/computer science competency and non-matriculated status should be directed to the Graduate Admissions Office.

## **Degree Requirements**

To qualify for the master of Compute Science degree, a student must complete thirty (30) credits at the graduate level. Additional undergraduate coursework may be required to satisfy prerequisite requirement or remedy deficiencies as identified by the Admissions Committee. M.S. degree requirements must be satisfied within 7 years of acceptance into the program, with a cumulative index of no less than 3.0. Requests for any extension of the seven year limitation must be made, in writing, to the Program Director. Students must take at least six (6) courses at or above the 600 level.

Each student, upon acceptance into the program, will receive a list of prescribed courses to be successfully completed. Graduate students are assigned a faculty advisor who assists in program planning.

All courses leading to the M.S. degree are offered in the late afternoon and evening in order to serve the needs of the working adult. Part-time students are limited to registering for one course during their first semester unless prior approval is granted by the Program Director. Full-time study is defined by a semester load of twelve (12) or more credits.

#### **Matriculated Status**

Applicants who satisfy all requirements, including undergraduate prerequisite courses for admission into the graduate program are admitted as matriculated students. Those applicants who are required to complete undergraduate prerequisite courses are admitted as non-matriculated students. Graduate students must matriculate upon completion of prerequisite courses.



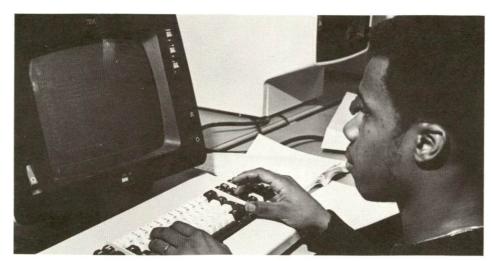


## The Curriculum

## Requirements for the M.S. degree are as follows:

Area A	Programming Languages (at least 2 courses)
24510	Software Design and Development
24610	Advanced Theory of Programming Languages
24611	Formal Methods in Programming Languages
24612	Architecture of Assemblers
24613	High Level Language Computer Architecture
Area B	Operating Systems and Computer Architecture (at least 2 courses)
24520	Performance Evaluation
24620	Computer Communication Networks and Distributed Processing
24521	Large Computer Architecture
24621	Real-Time Systems
Area C	Theoretical Computer Science (at least 1 course)
24530	Algorithms
24531	Automata, Computability, and Formal Languages
24532	Applied Combinatories and Graph Theory
24630	Theory of Computations
Area D	Data and File Structures (at least 1 course)
24540	Information Systems Design
24541	Information Storage and Access
24640	Distributed Database Systems
Area E	Other Topics (at least 1 course)
24550	Artificial Intelligence
24650	Pattern Recognition
24651	Computer Graphics
24652	Modeling and Simulation
24653	Legal and Economic Issues in Computing
24654	Introduction to Symbolic and Algebraic Manipulation
Area X	Capstone Activity (2 courses)
24700	Thesis I
24701	Thesis II
24710	Project
24711	Seminar

All courses carry three (3) graduate credits.



#### **Capstone Activity**

Two methods are available which allow the master's degree candidate to demonstrate a satisfactory level of competence in writing, speaking, and research.

## Option I - Thesis (6 credits)

For those choosing the thesis option, the steps to be followed in fulfilling the thesis requirement are:

- The student must submit a proposal to the Computer Science Department at the completion of eighteen (18) graduate credits.
- 2. The thesis proposal will be circulated among graduate faculty members who may comment on the proposal's feasibility, logical consistency, and worthwhileness. A simple majority of the faculty approving the proposal constitutes acceptance of the Department.
- 5. The student's thesis committee will be formed as follows: the student selects two faculty members to serve as the supervisor and the reader of the thesis. The Graduate Program Director appoints two additional faculty members.
- 4. The student must submit the completed thesis to the committee by the middle of the last semester of graduate study. The thesis must be acceptable to at least three of the four members of the committee.
- After successful completion of all of the above, the student is to submit four copies of the thesis, one each to the supervisor, the reader, the department, and the library by the beginning of the last week of the last semester of graduate study.

Students selecting the Thesis Option must register for 24700 Thesis I and 24701 Thesis II during two consecutive semesters, or both courses during the last semester.

## Option II—Project and Seminar (6 credits)

This option facilitates the use of practical and useful computer programs as a project topic. In particular, the program which is developed to interface with the work of fellow students will give important laboratory experience in some of the crucial aspects of software design and development.

The Project may be carried out alone or in cooperation with one or two other candidates. The Seminar, which follows the Project in point of time, is a group activity in which each student describes the Project orally and also develops written critiques of similar oral presentations by fellow students.

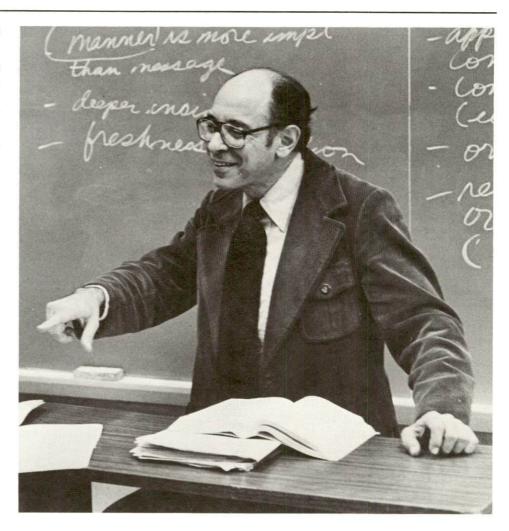
Students selecting the Project and Seminar Option must register for 24710 Project and 24711 Seminar during two consecutive semesters.

#### **Facilities and Equipment**

An IBM 4341, located in Donnelly Hall, supports the Marist College timesharing system. This system is used by Marist College and other institutions for administrative applications, instructions and research.

Students, faculty members and staff members can communicate with the computer through interactive terminals from various locations on campus. The student terminal rooms house 30 terminals for student use and three classrooms are equipped with a terminal and monitor to facilitate instruction.

The software available on the system includes the programming languages VSAPL, PASCAL, ASSEMBLER, ALGOLW, BASIC, FORTRAN, and PL/C, as well as the following packages: SCRIPT, SPSS, STATPAK, COGO, POLYSOLVE, and a full-screen editor.



## Suggested Curriculum Outline (PART-TIME PROGRAM)

Year 1	Fall	Spring	g Summer
	3 cr.	3 cr.	3 cr.
		3 cr.	
	-		
	3 cr.	6 cr.	3 cr.
Year 2	3 cr.	3 cr.	_
	3 cr.	3 cr.	
	6 cr.	6 cr.	
Year 3	Capstone 3 cr.	Capstone	3 cr.

TOTAL: 30 graduate credits

3 cr.

3 cr.

## **Course Descriptions**

## MSCS 24510 Software Design and Development

This course presents a formal approach to state-of-the-art techniques in software design and development and provides a means for students to apply the techniques.

## MSCS 24610 Advanced Theory of Programming Languages

This is a course in the formal treatment of programming language translation and compiler design concepts. Emphasis is on the theoretical aspects of parsing context-free languages, translation specifications, and machine-independent code improvement.

## MSCS 24611 Formal Methods in Programming Languages

Data and control abstractions are considered. Advanced control constructs including backtracking and nondeterminism are covered. The effects of formal methods for program description are explained. The major methods for proving programs correct are described.

## MSCS 24612 Architecture of Assemblers

Anatomy of an assembler; source program analysis, relocatable code generation, and related topics. Organization and machine language of two or three architecturally different machines; survey and comparison of these machines in various programming environments.

#### MSCS 24613 High Level Language Computer Architecture

An introduction to architectures of computer systems which have been developed to make processing of programs in high level languages easier.

## MSCS 24520 Performance Evaluation

A survey of techniques of modeling concurrent processes and the resources they share. Includes levels and types of system simulation, performance prediction, benchmarking and synthetic loading, hardware and software monitors.

#### MSCS 24620 Computer Communication Networks and Distributed Processing

A study of networks of interacting computers. The problems, rationales, and possible solutions for both distributed processing and distributed databases will be examined. Major national and international protocols including SNA, X.21, and X.25 will be presented.

## MSCS 24521 Large Computer Architecture

A study of large computer systems which have been developed to make special types of processing more efficient or reliable. Examples include pipelined machines and array processing. Tightly coupled multiprocessors will be covered.



## MSCS 24621 Real-Time Systems

An introduction to the problems, concepts, and techniques involved in computer systems which must interface with external devices. These include process control systems, computer systems embedded within aircraft or automobiles, and graphics systems. The course concentrates on operating system software for these systems.

## MSCS 24530 Algorithms

This course will develop students' abilities as writers and critics of programs by exposing students to problems and their algorithmic solution.

## MSCS 24531 Automata, Computability, and Formal Languages

This course offers a diverse sampling of the areas of theoretical computer science and their hierarchical interconnections. Basic results relating to formal models of computation will be introduced.

## MSCS 24532 Applied Combinatorics and Graph Theory

A study of combinatorial and graphical techniques for complexity analysis including generating functions, recurrence relations, Polya's theory of counting, planar directed and undirected graphs, and NP complete problems. Applications of the techniques to analysis of algorithms in graph theory and sorting and searching.



MSCS 24630 Theory of Computation A survey of formal models of computation. Includes Turing Machines, partial recursive functions, recursive and recursively enumerable sets, the recursive theorem, abstract complexity theory, program schemes, and concrete complexity.

## MSCS 24540 Information System Design

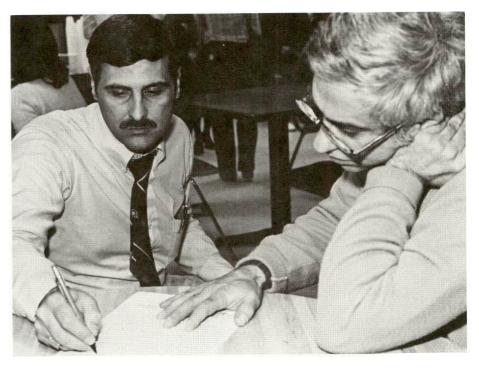
A practical guide to Information System Programming and Design. Theories relating to module design, module coupling, and module strength are discussed. Techniques for reducing a system's complexity are emphasized. The topics are oriented toward the experienced programmer or systems analyst.

## MSCS 24541 Information Storage and Access

Advanced data structures, file structures, databases, and processing systems for access and maintenance. For explicitly structured data, interactions among these structures, accessing patterns, and design of processing/access systems. Data administration, processing system life cycle, system security.

## MSCS 24640 Distributed Database Systems

A consideration of the problems and opportunities inherent in distributed databases on a network computer system. Includes file allocation, directory systems, deadlock detection and prevention, synchronization, query optimization, and fault tolerance.



## MSCS 24550 Artificial Intelligence

This course introduces students to basic concepts and techniques of artificial intelligence, or intelligent systems, and gives insights into active research areas and applications. Emphasis is placed on representation as a central and necessary concept for work in intelligent systems.

#### MSCS 24650 Pattern Recognition

An introduction to the problems, potential, and methods of pattern recognition through a comparative presentation of different methodologies and practical examples. Covers feature extraction methods, similarity measures, statistical classification, minimax procedures, maximum likelihood decisions, and the structure of data to ease recognition. Applications are presented in image and character recognition, chemical analysis, speech recognition, and automated medical diagnosis.

#### MSCS 24651 Computer Graphics

An overview of the hardware, software, and techniques used in computer graphics. The three types of graphics hardware: refresh, storage, and raster scan are covered as well as two-dimensional transformations, clipping, windowing, display files, and input devices.

## MSCS 24652 Modeling and Simulation

A study of the construction of models which simulate real systems. The methodology of solution will include probability and distribution theory, statistical estimation and inference, the use of random variates, and validation procedures. A simulation language will be used for the solution of typical problems.

## MSCS 24653 Legal and Economic Issues in Computing

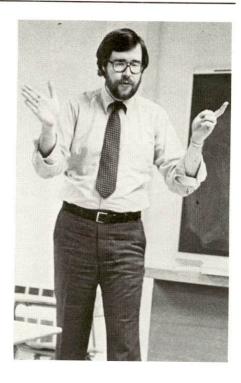
A presentation of the interactions between users of computers and the law and a consideration of the economic impacts of computers. Includes discussion of whether or not software is patentable, as well as discussion of computer crime, privacy, electronic fund transfer, and automation.

## MSCS 24654 Introduction to Symbolic and Algebraic Manipulation

A survey of techniques for using the computer to do algebraic manipulation. Includes techniques for symbolic differentiation and integration, extended precision arithmetic, polynomial manipulation, and an introduction to one or more symbolic manipulation systems. Automatic theorem provers are considered.

## Graduate Tuition and Fees (1982-83)

Tuition (per semester hour)	\$155.00
Application Fee (Non-Refundable)	20.00
Registration and College Services Fee – per semester	15.00
Matriculation Fee	30.00
Maintenance of Matriculation Fee	15.00
Reinstatement Fee (Non-Refundable)	30.00
Degree Fee	30.00
Thesis Fee	30.00
Transcript Fee (Payable at Time of Request)	2.00
*No registration will be accepted after the first week of classes.	2.00





Additional information on academic policies, grading, campus facilities and financial aid may be found in the 1982-83 Graduate Programs bulletin, available from the Graduate Admissions office.

## **Full-Time Faculty**

## KEVIN CAROLAN, Associate Professor of Mathematics

B.A., Marist College

M.S., St. John's University

Programming languages

#### LYNNE DOTY, Assistant Professor of Mathematics

B.S., East Stroudsburg State College

M.A., SUNY - College at New Paltz

Ph.D. Candidate - Stevens Institute of Technology

Graph Theory

#### CARL L. GERBERICH, Visiting Professor of Computer Science

B.S., Lebanon Valley College

M.S., University of Tennessee

M.A., Syracuse University

M.Ph., Syracuse University

Ph.D. Candidate, Syracuse University

Numerical analysis, hardware and software systems design, artificial intel-

ligence, heuristics, software systems management

## JOHN MACDONALD, Professor of Computer Science, Program Director

B.S.E.E., Purdue University

M.E.E., Syracuse University

Ph.D.E.E., University of Illinois

Analytical performance modeling, logical design and information theory

## ROBERT MEADOWCROFT, Assistant Professor of Computer Science

B.S., Lehigh University

M.S., Lehigh University

Ph.D., Lehigh University

Large scale data base design and implementation, on-line interactive applications, logical characterizations of physical systems

## JOHN PAGLIARULO, Assistant Professor of Computer Science

B.S., Boston College

M.S.C.S., Union College

Computer based instruction.

## JOHN RITSCHDORFF, Assistant Professor of Mathematics

B.A., Marist College

M.S., New York University

Ph.D. Candidate, New York University

Artificial intelligence, machine learning, operations research

#### TIMOTHY TOMASELLI, Adjunct Professor of Computer Science

B.E., Stevens Institute of Technology

M.S., Stevens Institute of Technology

Ph.D. Candidate, Stevens Institute of Technology

Algorithms and Automata

#### ROBERT VIVONA, Assistant Professor of Computer Science

B.A., Fordham University

M.A., Fordham University

Programming languages and operations research

## **Computer Science Advisory Board**

#### Chairman

Dr. Paul R. Low GTD Vice President & General Manager, E. Fishkill IBM Corporation, Route 52 Hopewell Junction, New York 12533

#### Members

Dr. Winifred A. Asprey Professor of Math Director of Computer Center Vassar College Raymond Avenue Poughkeepsie, New York 12601

Mr. Robert Berger Director of Electronic Data Processing Central Hudson Gas & Electric Co. 284 South Avenue Poughkeepsie, New York 12601

Dr. Robert L. Carberry Kingston Lab Director IBM Corporation — Dept. 61V Mail Station 630 Kingston, New York 12401

Mr. James Falanga Associate Director of Computer Science Marist College Computer Center Poughkeepsie, New York 12601

Mr. Joseph Fisher Administrator of Computer Services New York Power Pool 3890 Carman Road Schenectady, New York 12303

Mr. David Lampell Vice President TOPIC Systems, Inc. 85 Cannon Street P.O. Box 5279 Poughkeepsie, New York 12602

Dr. John E. MacDonald, Jr. Director of Computer Science Marist College North Road Poughkeepsie, New York 12601

Mr. Randy Sutherland Asst. Director of Systems & Planning Alfa-Laval Corporation 350 Dutchess Turnpike Poughkeepsie, New York 12601





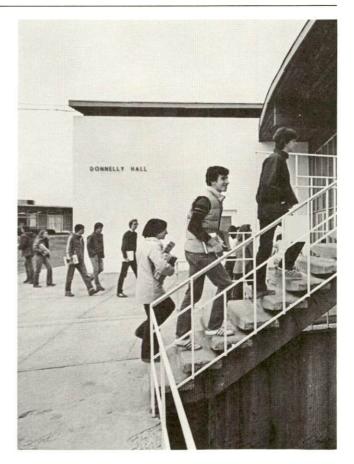
## **Campus Directory**

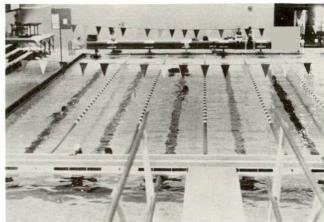
Office	Location	Tel. Ext.
Business Office	Donnelly	310/312
Campus Center	Champagnat	279
Career Counseling/Placement	Champagnat	152
Financial Aid	Adrian	230/232
Graduate Admissions	Donnelly	221
Housing	Champagnat	307
Program Office, MA Psychology	Donnelly	297
Program Office, MBA	Donnelly	225
Program Office, MPA	Donnelly	280
Program Office, MSCS	Donnelly	371
Security	Donnelly	282
Veterans	Donnelly	250

Marist College supports the principle of equal opportunity. All applications are accepted and reviewed without regard to race, religion, sex, age, color, disability or national origin.

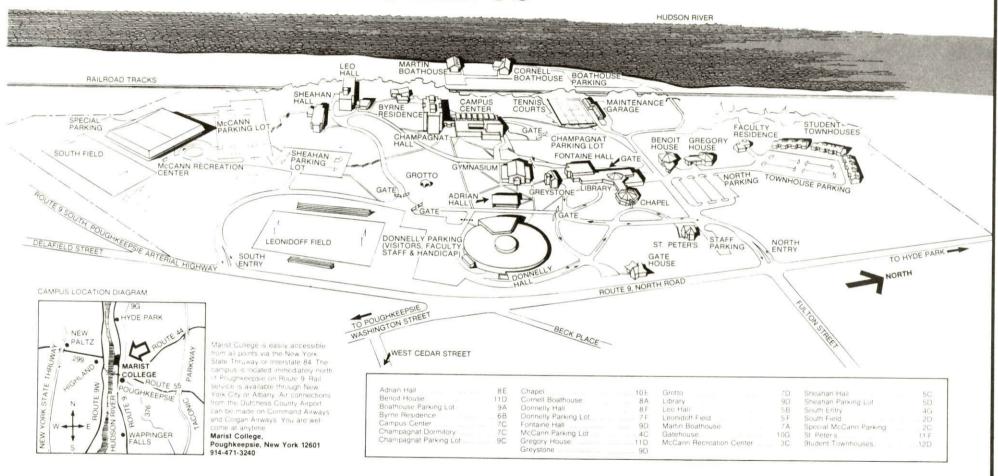
It is also the policy of Marist College to recruit, employ, promote and compensate all employees and applicants for employment without regard to race, religion, sex, age, color, disability or national origin.

Furthermore, it is the policy of the College to operate and support all of its educational programs and activities in such a way as does not discriminate against any individual on the basis of those characteristics stated above.





## MARIST COLLEGE CAMPUS



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## MARIST COLLEGE

Poughkeepsie, New York 12601 914-471-3240