

Self-Study Report
Prepared for
Academic Program Review

Department of Computer Science
Memorial University of Newfoundland

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Appendix B:	Promotional department information
Appendix C:	Undergraduate program information
Appendix D:	Graduate program information
Appendix E:	Faculty and staff information
Appendix F:	Departmental budget allocations
Appendix G:	Departmental computing resources

1.0 Background Information

1.1 Introduction of Computer Science at Memorial University

Our history began at Memorial University in the 1968-1969 academic year with the offering of an introductory course in computer science within the Department of Mathematics. Student interest in the discipline grew at an enormous rate, as well as demand for additional courses. Over the next several years, with the support of members of the Department of Mathematics and the University administration, additional faculty were appointed with specific duties to teach and promote the discipline of computer science, leading to the formation of a Computer Science Group.

Ten years later, in 1978, Memorial invested in the future when the Department of Computer Science was created by the University Senate. The department initially had seven faculty members, all of whom had formed the nucleus of the Computer Science Group, and two members of staff for administrative and systems support purposes. Some of these individuals are current members of the department, almost 25 years later.

1.2 Modifications to Computer Science Program Offerings

By 1974, there were sufficient course offerings to enable students to obtain a general degree in computer science, in either Arts or Science. An Honours program was introduced in 1976; a Master's program was approved the following year. Admission of the first graduate student, as well as a minor in computer science, came at the same time. A PhD program came on-stream in 1993. Two specialty programs, an Honours in Computer Science (Software Engineering) and a Computer Industry Internship Option Program (CIIO) were introduced in 1997.

The foundation of all of our degree programs is based on the theoretical aspects of computer science. All program offerings are intended to be challenging, dedicated to the evolution of computer science. They attempt to strike a balance between the study of hardware, software, theory and practice. As new courses were developed, their structure and content followed, as closely as possible, the recommendations set forth by the Association for Computing Machinery's (ACM's) "Curriculum 68" report¹, refined and updated in the "Curriculum 78" report². Refinement and periodic updating continued over the years, always attempting to remain current in a rapidly changing discipline, while tailored to local conditions, faculty interests and available computing facilities.

¹ ACM Curriculum Committee on Computer Science. Curriculum 68: Recommendations for the undergraduate program in computer science. Communications of the ACM, March 1968.

² ACM Curriculum Committee on Computer Science. Curriculum 78: Recommendations for the undergraduate program in computer science. Communications of the ACM, March 1979.

Our core curricula, the set of mandatory courses prescribed for all of our major programs, are intended to provide a wide coverage of the discipline of computer science. For the most part, their content matches those of computer science programs at other universities, from the introductory level to the more advanced. The content of our elective course offerings, primarily at the 4000-level, is intended to provide depth of exposure to computer science, and are chosen by students to round out their specific interests and degree requirements. They also follow ACM's recommendations, as do our degree requirements for courses in mathematics and statistics.

A thorough internal review of the computer science curriculum was carried out in 1991 by a Departmental Curriculum Review Committee. They also conducted a survey among the computer science student population to gain their point of view. Several problem areas were identified. The Committee based its recommendations on the Report of the ACM/IEEE Joint Curriculum Task Force: Computing Curricula 1991³. The current course offerings and degree regulations reflect the outcome of this review. A review is again required so that our course offerings reflect the recommendations proposed by ACM in their "Computing Curricula 2001" report⁴.

1.3 Departmental Goals and Strategic Planning

In 1978, in preparing for departmental status, the Computer Science Group presented a document to the University Senate in which its departmental goals were defined. These goals were recently discussed at a departmental meeting, and with minor editing, it was agreed that they are still valid.

To guide the members of the department in fulfilling its functions, to form a basis for judgement on such matters as faculty recruitment, promotion and tenure, changes to existing courses and new course proposals, planning for future programs, equipment requirements, etc., the following goals are declared:

- Goal 1: To promote excellence in teaching and to provide students with an education that will help them:
- a. To enjoy the traditional benefits of a broad university education
 - b. To pursue useful careers in computing
 - c. To assume a high position of leadership in society in general and in the profession in particular
 - d. To carry on their education through subsequent degree programs

³ Tucker, A.B., Barnes, B.H., Aiken, R.M. et al. Computing Curricula '91. Association for Computing Machinery and the Computer Society of the Institute of Electrical and Electronics Engineers, 1991.

⁴ Year 2001 Model Curricula for Computing (Computer Curricula 2001).

- e. To develop a code of professional ethics compatible with the best interests of society
- f. To understand the need for constant effort in maintaining their education.

- Goal 2: To provide and advance graduate programs in computer science.
- Goal 3: To create, disseminate, and advance knowledge of all aspects of the discipline of computer science through development of research and professional activities.
- Goal 4: To provide educational opportunities, leadership, and expertise in the broad area of computing and information technologies to the University community, to government, to local industry, and to the community at large.

From the very beginning, the mandate of the department has been to put forth its best efforts to educate its undergraduate majors, non-majors, and graduate students in the fundamentals of the computing discipline, while at the same time, to keep pace with the rapid changes and advances in the discipline, and to provide a well-balanced foundation in the science of information processing.

Our graduate programs provide local accessibility to graduate education in computer science. Program flexibility offers working professionals in the surrounding community unique opportunities to pursue further studies. Graduate students are also recruited from other provinces and countries, in areas of specialization which may have relevance to the Province, depending on the supervisor's research interests.

The Department of Computer Science provides an opportunity for all members of the University community to obtain a knowledge of the capabilities, limitations and implications of computers, essential to every well-informed individual in today's society. With scheduling flexibility, the department provides, and will continue to do so, unique opportunities to full- and part-time students, working professionals and the general public.

1.4 Status of Program, Relative to Other Departments, Provincially and Nationally

The curricula for computer science programs at most universities, in Canada and internationally, is fairly standard, and follows the recommendations of the Task Force of the ACM and/or ACM/IEEE. Elective course offerings may vary, reflecting the specific research interests of the faculty, but to a large extent, the content of these courses is also consistent. Likewise, degree requirements for mathematics courses are also fairly standard. Within Atlantic Canada, the computer science departments, through the Atlantic Provinces Council on Sciences (APICS), maintain a database of course equivalencies. This commonality of course content greatly facilitates the transfer of credits for students who choose to do computer science courses or programs at more than one university.

1.5 Previous Departmental Reviews

The Department of Computer Science has had only one external review, in November 1982. An internal review of the curricula was carried out by members of the department in 1991, as was previously mentioned.

In 1997, the Office of Budgets and Audits at Memorial carried out an internal audit to examine and evaluate the system of internal control in place within the department. In 2000, the Dean of Science requested the Office of Budgets and Audits to review the administrative functions of the departments within the Faculty of Science, in terms of efficiency, economy and effectiveness. In both instances, the department was advised of no serious problems.

1.6 Process Used to Prepare the Self-Study Report

This Self-Study Report was prepared primarily by the Interim Head of the Department, the Administrative Staff Specialist, and the Secretary to the Head. Faculty provided vital input, individually and through general discussions at departmental meetings. Graduate students and staff also provided valuable input. Our Systems Manager provided input pertaining to the departmental computing resources.

Several sources were used to gather student information, in particular, student files available within the department, the Office of the Registrar, and reports from the Centre for Institutional Analysis (CIAP), who carried out surveys of our current majors at the 3000- and 4000-level, as well as recent graduates of our undergraduate programs.

The template that was provided by the Office of the Vice-President (Academic) was followed, with the exception of section 2.0, which now includes student information for undergraduates only. Graduate information was moved to section 3, where an additional section was added, namely 3.2.3. Scholarships and Other Awards.

This report contains seven appendices as follows:

- Appendix A: Survey results
- Appendix B: Promotional department information
- Appendix C: Undergraduate program information
- Appendix D: Graduate program information
- Appendix E: Faculty and staff information
- Appendix F: Departmental budget allocations
- Appendix G: Departmental computing resources

2.0 Undergraduate Student Information

2.1 Number of Full- and Part-time Students in Undergraduate Program

In comparing the number of undergraduate students who are currently pursuing a degree in computer science at Memorial with those over the previous four years, it is quite evident from the following table that this number has declined dramatically in the 2001-2002 academic year. It should be noted that these numbers may not be a true reflection of the actual number of computer science majors at this time, in that students can register for computer science courses and work toward a degree in computer science, without declaring a major. They can do so, within the Faculties of Arts and Science, until they are ready to graduate. The department has no admission policies in place, other than those which are prescribed for admission to a faculty.

Table 1
Declared Computer Science Majors

Academic Year	Declared Majors	
	Full-time	Part-time
2001 - 2002	239	21
2000 - 2001	316	18
1999 - 2000	326	n/a
1998 - 1999	347	n/a
1997 - 1998	330	18

The majority of our undergraduate students pursue a B.Sc. degree, even though the opportunity is there for them to do either a B.Sc. or a BA. The number of students in the BA program averages 8 percent (over the last five years), although the number has been decreasing steadily over the last seven years.

Internal reports published by CIAP, for Fall Semesters 2000 and 2001 only, show a decrease of 2 percent in the number of computer science majors pursuing a B.Sc degree. Within the Faculty of Science, computer science ranks fourth out of a possible nine, in terms of total number of majors. Averaged over the past five years, 17 percent of our majors were female, the lowest percentage in the faculty and the University as a whole.

2.2 Academic Quality of Students Upon Acceptance to Program

Admission to the general degree program in computer science is neither limited nor competitive. Requirements, as specified in the University Calendar, must be met for admission to the Faculties

of Arts or Science. Admission to computer science is made upon formal application, however, academic qualifications are not taken into consideration and this application may be made at any time. Therefore, there are no mechanisms in place to control the academic quality of computer science students. As long as they are academically eligible to remain in University, they can be computer science majors. Computer science has an “open-door” admission policy. Students can register for their first course in computer science, COMP-1700, on entry to Memorial provided that they have completed advanced mathematics at the high school level, otherwise registration is delayed until successful completion of MATH-1000, Calculus I.

2.3 Scholarships and Other Awards Earned by Undergraduate Students After Entering Program

Table 2
Scholarships Earned by Undergraduate Students

Academic Year	Number	Value
2001 - 2002	9	\$16,400 *
2000 - 2001	15**	13,950 *
1999 - 2000	10	17,500 *
1998 - 1999	7	8,500 *
1997 - 1998	12	23,700 *

*Notes: * Includes University Medal for Academic Excellence, no dollar value*

*** Includes first winner of the NortelWISE Scholarship.*

The above information was obtained from the Student Support Program Office and from departmental files.

2.4 Attrition From and Retention in Programs

It is difficult to determine attrition and retention in the computer science program, as students are able to declare their major in computer science at any time. Therefore, to track their exit from the program is not straightforward, and the data that are available from the Office of the Registrar reflects the open admission policy for computer science.

Our faculty have expressed concern on numerous occasions that the academic quality of our majors has seriously deteriorated over the past number of years. Although statistics produced by

CIAP⁵ are only available for Fall Semesters 2001, 2000 and 1998, they do show that the department, based on an average of 209 declared majors, had the highest percentage of low achievers in the Faculty of Science, and the University as a whole, at approximately 16 percent. Furthermore, these same majors had the lowest overall average within the Faculty, 64.2 percent, and completed the least number of courses in a semester at 3.8. These are not numbers of which to be proud. This is not to say that we do not have excellent students in our program. We do. Except that the number of students whose academic performance is low evidently far exceeds those who do well. Our doors may be too widely open.

It is felt that the high failure rates in computer science courses, especially at the 1000- and 2000-levels, could be reduced considerably with the establishment of a Computer Science Help Centre. The department currently has no central facility where students can go to receive assistance outside of regularly-scheduled class time. This matter will again be pursued.

Over the next several months, statistics will be collected by the department in an attempt to determine if there are other contributing factors for this large percentage of low achievers, in particular, their performance in mathematics courses since our core program is very theoretically based.

2.5 Average Time to Graduation

Our undergraduate program is set up to be completed in four years over eight semesters (assuming a full course load). COMP-1700 would normally be taken in the second semester of the first year. Hence, it would normally take seven semesters to complete the core computer science course requirements. A review of the transcripts of those students who graduated from the undergraduate program in the past five years shows that the average time to complete required computer science courses is 8.42 semesters.

⁵ *Academic Performance Profile - Fall 2001*, Centre for Institutional Analysis and Planning, CIAP Report 2002-01, March 2002. *Academic Performance Profile - Fall 2000*, Centre for Institutional Analysis and Planning, CIAP Report 2001-03. *Academic Performance Profile - March 2000*, Centre for Institutional Analysis and Planning, CIAP Report 2000-02.

Table 3
Average Time to Graduate

Academic Year	Convocation	Number of Semesters to Complete Required CS Courses	Average Number of Semesters for Convocation Year
2001-2002	October 2001	7.78	7.84
	May 2002	7.90	
2000-2001	October 2000	8.25	8.73
	May 2001	9.20	
1999-2000	October 1999	8.43	8.18
	May 2000	7.92	
1998-1999	October 1998	9.44	8.67
	May 1999	7.90	
1997-1998	October 1997	8.67	8.66
	May 1998	8.64	

The annual survey of Canadian computer science departments for the 2001-2002 academic year shows that in terms of the number of undergraduate degrees conferred, Memorial (52) ranks 15th, with 21 universities reporting. In Atlantic Canada, Dalhousie (88) and the University of New Brunswick (125) ranked above Memorial.

Table 4
Undergraduate Degrees Awarded

Academic Year	Number Convocating	Male/Female
2001 - 2002	52	43/9
2000 - 2001	64	47/17
1999 - 2000	53	43/10
1998 - 1999	61	55/6
1997 - 1998	51	48/3

2.6 Student Involvement in Departmental Governance

The amount of involvement by students in departmental governance is very limited. At the present time, one undergraduate and one graduate student serve on the Departmental Undergraduate Studies and Graduate Studies Committees, respectively. These students are appointed to these committees by the head and serve for a period of one year. The President of the Computer

Science Club has the opportunity to discuss student-related matters with the department head on an informal basis, and as matters or problems arise.

2.7 Post-graduation Activities by Students

Career search statistics, obtained from the Department of Youth and Post-Secondary Education, Government of Newfoundland and Labrador, state that 96.3 percent of our computer science graduating class are employed full-time, and 69 percent considered their jobs to be directly related to their training. Graduates also reported that 44.4 percent were employed before graduating and 33.3 percent within three months of graduating. As well, “. . . a higher proportion of this program’s graduates reported earning a salary in excess of \$560 a week,” and 50 percent reported earnings at \$800 a week or higher.⁶

In order to gather information for inclusion in this report, in June 2002, CIAP carried out a telephone survey of students who graduated from our program over the past five years (May 1997 to October 2001) with a first or second major in computer science. Of the 285 names which were produced, a total of 76 completed surveys were received. The results of this survey indicate that 96.1 percent have been employed in a job since graduating; 43.0 percent had their job prior to graduating; 56.9 percent stated that the subject area was related to their job; 91.8 percent are currently employed; 36.8 percent have pursued further education and of these, 42.9 percent have gone on to graduate studies. A copy of the survey is included, excluding students’ comments (see Appendix A.1).

3.0 Teaching Activity

3.1 Undergraduate

3.1.1 Programs Offered

Administratively, the Department of Computer Science is within the Faculty of Science; academically, it is within both the Faculties of Arts and Science. This means that for the majority of our program offerings, a student has the option of choosing to do either a B.Sc. or a BA degree in computer science. The computer science and mathematics course requirements are the same for students in either faculty, with the main difference being in the student’s choice of electives to meet degree requirements. A minor in computer science is available in both faculties. We also offer a number of joint interdisciplinary programs, for both majors and honours, which allow for a concentration of courses in computer science as well as in another discipline of the student’s choice.

⁶ *Career Search 2002*, Government of Newfoundland and Labrador, Department of Youth Services and Post-Secondary Education, via fax July 17, 2002.

The many and varied undergraduate programs offered by the department include:

- Major and Honours in Computer Science (B.Sc. or BA)
- Honours in Computer Science (Software Engineering, B.Sc. only)
- Computer Industry Internship option (CIIO), (B.Sc. or B.Sc. Honours only)
- Minor in Computer Science (B.Sc. or BA)
- Computer Science Joint Major (B.Sc. only) with: Applied Mathematics, Pure Mathematics, Statistics, Physics, Economics, and Geography (Cartography option)
- Computer Science Joint Honours (B.Sc. only) with: Pure Mathematics, Physics, and Geography (Cartography option only)
- Joint Degree of Bachelor of Computer Science and Bachelor of Commerce (Co-operative)

The most recent additions to our program offerings include the Software Engineering program, the Computer Industry Internship Option (CIIO), and the joint degree program with the Faculty of Business Administration.

See Appendix C.1 for a complete list of undergraduate course offerings.

The department has chosen not to seek accreditation for any of its degree program offerings.

The following table lists the number of majors in each of our program offerings for the 2001-2002 academic year. Many programs, including our interdisciplinary ones, are under-subscribed. This may be a result of programs not being specifically streamlined to meet student's needs. All programs need to be made more widely known to entering students.

Table 5
Student Enrolment by Program Option

Program	2001-2002 Enrolment
Majors in Computer Science	<u>239</u>
B.Sc	224
BA	15
Honours in Computer Science	8
Honours in Computer Science (Software Engineering, B.Sc. only)	3
Computer Industry Internship Option (B.Sc. or B.Sc. Honours only)	4
Minor in Computer Science (B.Sc. or BA)	21
Computer Science Joint Major and Joint Honours (B.Sc. only):	
Applied Mathematics	6
Pure Mathematics	8
Statistics	2
Physics	6
Economics	1
Geography (Cartography option)	2
Joint Degree of B.Sc. and B. Comm (Co-op)	16

Internship Option

The internship option provides an opportunity for qualified students to obtain rewarding employment in computer industries for 8, 12, or 16 consecutive months, gaining practical skills in an employment situation during the course of their studies. Since its inception in 1997, students have been placed locally, nationally, and internationally. These students must complete progress reports throughout their internship and, in addition, are assessed on their performance at the end of the internship. With the recent downturn in the economy, some difficulties were encountered in securing student placements this past academic year.

Software Engineering

The software engineering option was introduced in the department in 1997. (The inclusion of the words “Software Engineering” in the program title caused considerable controversy, which ultimately resulted in court action being taken.) Upon successful completion of this program, the following notation is included on the student’s graduation certificate:

“Completion of the Honours in Computer Science (Software Engineering) Programme does not qualify persons to hold the designation “Professional Engineer” as defined by various Provincial Acts governing the Engineering Profession”.

3.1.2 Relationship of Curriculum to Departmental Goals

Graduates of our bachelor’s programs are expected to be well rounded in the foundations of computer science and fairly proficient in a few programming languages with exposure to several others; however, our goal is not to make them multilingual coders. They have no strong specialty, but they have been exposed to the concepts generally recognized as essential in a computer science program. They should be readily employable in computer-related industries, be alert to changing market conditions, and their need to keep pace with ever-changing technology.

Students who go on to pursue an honours program have broadened and deepened their knowledge of computer science. Under the supervision of a faculty member, these students must produce a written report on their project, including literature research, and they must present their work at a departmental seminar. Topics for honours projects may be chosen from theoretical aspects, application problems, other disciplines, or from local industry (see Appendix C.2). Over the past five years, one faculty member has supervised more than 50 percent of honours projects and these have been in the application area.

The results of the surveys carried out by CIAP of students who had graduated from our undergraduate programs over the past five years, and our third and fourth year majors, are included in Appendix A.1, with individual comments deleted. As indicated by our students, the department is meeting some of its goals, but not all. Particular concerns expressed by these students are the need for program revision, more faculty, and insufficient course offerings. There is obviously considerable room for improvement and reflection. The results of the surveys must be taken seriously, and must be acted upon positively, by members of the department, with the assistance of the University administration, if computer science is to educate leaders in this discipline for the future.

Statistics from the Government of Newfoundland and Labrador, Department of Youth Services and Post-Secondary Education indicate that 96.3 percent of computer science graduates of the year 2000 are satisfied with the time invested in their program.⁷ This percentage has increased since 1996 (see Appendix A.2).

⁷ *Career Search 2002*, Government of Newfoundland and Labrador, *ibid*.

3.1.3 Program Innovations and Enrichments

Computer science makes use of the world wide web to provide easy access to information on all aspects of the department. The departmental web page was recently redesigned by a member of our systems support staff and unveiled to the public in April of this year. Information such as faculty profiles, their research interests, undergraduate and graduate program offerings, faculty admission and degree requirements, detailed course outlines, and a host of other useful information for students, and prospective students, can be found at our site (www.cs.mun.ca).

Our faculty also make use of the web as a tool to aid them in teaching and to communicate with students, as a whole or on an individual basis. Homework assignments are posted on the web, and for several of the courses and labs, students submit their assignments electronically. As well, students can complete interactive labs online and receive immediate response.

A new course will be offered in Winter 2003 Semester at the 4000-level entitled Introduction to Equational and Logic Programming. A fairly recent (Winter 2001) course offering in computational biology attracted students from a number of disciplines. More opportunities are expected to become available for students in the software engineering option, for example, discussions are underway for honours projects with local industries and governments.

Information sessions for potential computer science majors, targeting COMP-1700 students, will be held in Fall Semester 2002 to advise them of the many and varied programs that the department offers. We, as well, plan to target students completing their second year in the program to encourage them to consider program options. In addition, a one-page information handout has been prepared for distribution at the Faculty of Science Fair in September 2002 (see Appendix B.1).

The university is actively recruiting foreign students, and it is our understanding that a large percentage of them plan to enrol in computer science. In addition, the University has a signed Memorandum of Agreement with the International University in Germany, whereby a student exchange program is available on a semester basis. Our department has benefited from these programs. We are now processing a number of applications from foreign students for Fall 2002, at the undergraduate level. To date, no computer science students at Memorial have availed of the opportunity to study for a semester at the International University in Germany.

3.1.4 Collaboration with Other Academic Units and Universities

Our interdisciplinary degree programs are now well defined, so that collaboration with these academic units, as pertains to existing degree programs, has been minimal. However, a review of our programs for majors must also include a review of our

interdisciplinary programs and service course offerings. Consultation with other academic units takes place whenever either academic unit is making a change that impacts on the other. Each semester, efforts are made to ensure that course scheduling conflicts are at a minimum with other academic units. Our courses are available to all students who have met the necessary prerequisites.

Our systems personnel interact frequently with other academic units across campus with respect to in-house software development and maintaining computer equipment, computer laboratories, and other shared computer-related facilities. More detailed information is provided in Section 8.

A faculty member with the Faculty of Business Administration will be teaching a senior-level course for us in Winter 2003.

Our department was one of the leaders in Atlantic Canada to offer a degree program in computer science. As other programs came on-stream, our advice was often sought. This interaction with universities in Atlantic Canada has continued and is greatly influenced through our membership in APICS. The Heads of Computer Science Departments/Schools/Faculties from the region meet twice a year for discussion of matters which are relevant to all of us. At the fall meeting, frequently held as a joint meeting with mathematics, a computer science programming competition, and student and faculty paper presentations are held. Memorial always sends a computer science programming team who go head to head with their Atlantic counterparts in these annual competitions. In 1999, the meeting was hosted by Memorial, jointly by the Computer Science and Mathematics and Statistics Departments. In addition, a computer science course equivalency table has been maintained with our Atlantic counterparts.

3.1.5 Service Teaching

The department realizes that we must provide a service need—a computer literacy need, or a computer appreciation need—to all students at Memorial. We offer several courses at the 2000-level which are defined as service courses and for which a computer science major cannot receive credit to meet degree requirements. These courses have a reasonably high technical content for students in disciplines in science and business programs, with course restrictions accordingly.

Table 6
Service Teaching (2000-level only)

Academic Year	Fall	Winter	Spring	TOTAL
2001 - 2002 *	273	212	20	505
2000 - 2001 *	261	253	--	514
1999 - 2000 *	290	242	--	532
1998 - 1999	272	275	--	547
1997 - 1998	212	248	--	460
1996 - 1997	267	266	28**	561

Notes: Figures do not include lab registrations.

* *Figures do include distance education service course.*

** *Special session of COMP-2801 at request of the federal government.*

Course offerings which are clearly defined as being core for the computer science major are also service for the non-major. The course, Introduction to Computer Science, COMP-1700, fits into both camps.

3.1.6 Involvement with Interdisciplinary Programs

As previously noted, the department offers a number of interdisciplinary honours and general degree programs—with Applied Mathematics, Pure Mathematics, Statistics, Physics, Geography, Economics, and Business Administration.

3.1.7 Student Demand and Enrolment in Courses

Information published by CIAP⁸ shows a decline in enrolments in computer science at Memorial over the past five years, as well as a decline in total enrolments in the Faculty of Science. Of particular concern is the low number of females who are majoring in computer science.

With respect to student demand for courses, waitlists are maintained for certain of our courses at time of registration and are carefully monitored throughout the registration period. When classes begin, no declared computer science majors are turned away. Waitlists usually appear for service courses in fall semesters. Several disciplines require their students to take a computer science course in their second year but they do not specify the semester. We hold a specific number of seats for these students over two

⁸ CIAP, *ibid.*

semesters to accommodate these programs. Efforts are taken to ensure that students' progress is not in any way hindered.

The figures in the following table reflect enrolments at the start of each semester. Students can add courses up to the end of the second week of classes and can apply to drop a course at any time throughout the term.

Table 7
Departmental Registration Figures

Academic Year	Semester	1000 Level	2000 Level	2000 Service	3000 Level	4000 Level	Semester Total	Annual Total
2001 - 2002	Fall	174	220	271	259	122	1,046	1,945
	Winter	110	169	171	219	138	807	
	Spring	24		20	5	43	92	
2000 - 2001	Fall	222	276	259	270	149	1,176	2,281
	Winter	122	264	206	271	194	1,057	
	Spring	30			8	10	48	
1999 - 2000	Fall	300	345	253	235	130	1,263	2,399
	Winter	126	319	208	297	119	1,069	
	Spring	23			8	36	67	
1998 - 1999	Fall	299	398	288	271	159	1,415	2,886
	Winter	210	397	284	322	186	1,399	
	Spring	40			8	24	72	
1997 - 1998	Fall	313	341	246	215	148	1,263	2,650
	Winter	216	394	250	298	166	1,324	
	Spring	36			5	22	63	

*Notes: Figures do not include lab registrations.
Figures are as of the beginning of the semester.*

3.1.8 Student Advising

When the department is informed that a student has indicated his/ her intent to major in computer science, he/she is immediately sent a detailed letter (see Appendix B.2), by the Head of the Department, welcoming him/her to the department and wishing him/her success. At the same time, a faculty advisor is assigned. Students are encouraged to meet with their advisor prior to registering for courses each semester to ensure that courses are being selected that meet degree requirements. Students can also reference the Undergraduate Handbook which gives a structural chart of the order in which to complete courses. This handbook is available in print from the computer science general office or online at www.cs.mun.ca. With the changes to the registration process at Memorial, this method of advising is not functioning as well as it had in the past and requires review.

3.1.9 Distance Education

At the present time, the department offers one course through distance education in the service teaching area, the content of which is primarily directed to students in the Faculty of Business Administration. Enrolments in this course average approximately 26 students per semester and is offered twice per academic year.

Table 8
Distance Education (COMP-2801)

Academic Year	Fall	Winter	TOTAL
2001 - 2002	34	29	63
2000 - 2001	16	31	47
1999 - 2000	26	20	46

3.2 Graduate

3.2.1 Programs Offered

One of our stated goals is to provide and advance graduate programs in computer science. As such, the department now offers the degrees of Master of Science and Doctor of Philosophy, providing local accessibility.

Admission into the Master's program is primarily restricted to candidates who hold an honours degree or equivalent in computer science or a closely-related area. Prospective students with inadequate knowledge of computer science are eligible for admission, but would be required to take a prescribed set of undergraduate courses, possibly in parallel with their regulation graduate courses.

Admission into the PhD program is normally restricted to candidates holding an M.Sc. degree in computer science or a closely-related area. As with the Master's program, prospective students without a Master's degree may be admitted, but with a requirement to complete additional graduate courses, as prescribed by a supervisory committee.

Identification of the areas of specialization are a reflection of the expertise, strengths and interests of our faculty who have external funding to support graduate students. These programs are primarily project oriented, with a strongly-emphasized thesis requirement. The thesis projects may involve a theoretical investigation and/or the development of an

original, practical system. All candidates must present a seminar on their thesis topic, methods employed and research results. A comprehensive examination and an oral defence of the thesis are part of the degree regulations for the PhD program.

International students are strongly encouraged to submit results of the (general) Graduate Record Examination.

3.2.2 Program Applications, Enrolment, and Graduation Patterns

Our graduate students are screened by the departmental Graduate Studies Committee prior to being recommended for admission to one of our programs. The number of applications that the department received and processed over the past four years ranged from 42 to 94 (up to July 15, 2002), or an average of 66 per year. The majority of applicants are from foreign countries, especially the People's Republic of China. For the academic year 2001-2002, 94 applications were circulated to the committee and of these, 31 files were approved pending supervisor assignment. Of these, seven offers were made. A further 31 files are pending review.

Table 9
Number of Graduate Students

Academic Year	M.Sc.			PhD	
	Full-time Male/Female	Part-time Male/Female	On-leave Male/Female	Full-time Male/Female	Part-time Male/Female
2001-2002	3/1	2/0	1/0	4/0	1/0
2000-2001	5/1	0/1	1/0	4/0	1/0
1999-2000	3/3	1/0	0/1	4/0	0/0
1998-1999	2/6	2/0	0/0	4/0	0/0
1997-1998	5/4	3/3	0/1	3/0	1/0

The number of graduate students has declined dramatically over the past five years, by 44 percent, and is of great concern. No new students were admitted into either of the graduate programs in the 2001-2002 academic year. Four students had been accepted, however, their entrance was delayed because their supervisors were on sabbatical for that year. The intake for the 2002-2003 academic year is expected to be minimal.

Enrolments in our graduate programs have never been high, and the number of students currently enrolled is minimal, only five in each of the programs. This is of great concern.

Another concern is the number of students who enter our graduate program, especially the Master's program, and leave to pursue other available opportunities prior to finishing degree requirements. Employment opportunities for them are limitless, with high starting salaries, which are very appealing.

In terms of graduate student numbers, the survey of Canadian computer science departments for the 2001-2002 academic year shows, not surprisingly, that Memorial has the fewest number of full-time students in the Master's program across the country. Even within the Atlantic region, the numbers are well beyond those of ours—Memorial (6), Acadia (27), Dalhousie (162), and University of New Brunswick (73). At the PhD level, with 16 universities reporting, Memorial ranked 15th in terms of the number of full-time students. Three universities reported for Atlantic, with Memorial (6) placing 3rd, Dalhousie (24) and University of New Brunswick (19).

Entering M.Sc. and PhD students are required to do a minimum of five and three courses, respectively. These are normally taken in the first year with scheduling of two in fall, three in winter, or one in fall, two in winter, depending on the program. This scheduling is subject to change based on the program entrance date. The number of graduate level courses offered per year is dependent on the number of students still requiring courses. Graduate-level course offerings can span all areas of computer science and are a reflection of the background of students and the research areas of supervisors. In looking at the history of graduate course offerings (see Appendix D.1), it is quite evident that courses in the application areas are those most frequently offered, especially computer graphics. The other most frequently offered courses are in database technology, complexity of computational problems, and syntax and semantics of programming language.

Table 10
Graduate Degrees Awarded

Academic Year	Number Convocating	Male/Female
2001 - 2002	1	1/0
2000 - 2001	1	0/1
1999 - 2000	5	3/2
1998 - 1999	3	1/2
1997 - 1998	3	1/2
1996 - 1997	4	3/1

With a large percentage of students leaving before finishing their degree, the number of students who have graduated from our programs is, therefore, very low—only 36 M.Sc. students and one PhD since the programs were introduced. (For a listing of graduates and their theses topics for the last five years, reference Appendix D.2.) One faculty member has supervised 25 percent of the graduates from our M.Sc. program. There are nine students currently completing degree requirements, and three of these should graduate at the October 2002 Convocation. Seven applicants have been offered placement for September 2002—two have declined and we are awaiting the response of the other five. As previously noted, in the 2001-2002 academic year, four students were accepted but deferred to September 2002 as their supervisors were on sabbatical. To date, we know that one is coming.

Funding to support graduate students is problematic. Only eight of our faculty have external funding which can be used for this purpose. These grants are not large, and for the most part, can only support one graduate student at a time. Faculty without external funding are, for the most part, not involved with student supervision.

The baseline allocation which the department received from the School of Graduate Studies to supplement the students' income has been \$35,235 per year for the last five years. The amount of funding available from departmental sources and graduate studies, on an annual basis, is not known in advance. Where possible, supervisors match baseline allocations, however, this does not always equal the \$12,000 per annum for M.Sc. students, or \$14,000 per annum for PhD students. Some students have accepted placement with no funding. Several have been the recipients of external awards. We currently have full funding for one student from a supervisor from outside the department.

When possible, students are employed by the department on a semester basis, primarily as markers and occasionally, as per-course appointees, to provide them with additional funding. However, employment in the laboratories involving direct interaction with the undergraduate students is not always possible, if there is a language barrier.

3.2.3 Scholarships and Other Awards

We are pleased to recognize some of our graduate students for their accomplishments. An entering PhD student was the recipient of an F.A. Aldrich School of Graduate Studies Fellowship, valued at \$20,000 per annum and awarded for exceptional academic achievement. This award was renewed for a second year. Several students received the designation, "Fellow of the School of Graduate Studies" for obtaining a minimum average of 85 percent in the courses required for their program. Another of our senior PhD students was one of the 2002 recipients of an NSERC Postdoctoral Fellowship. This award recognizes academic excellence, research ability and potential, with leadership and communication skills. This same student received the 2000-2001 Graduate Student's Union Annual Award for Outstanding Graduate Student Research at the doctoral level.

This award is made each year to the doctoral student whose work has been of the highest calibre. This student's work in computational geometry is exceptional and has relevance to a wide range of related applications. Several of our graduate students, at the M.Sc. and PhD level, completed the Graduate Program in Teaching Certificate Program and the Training Program for International Teaching Assistants.

3.2.4 Relationship of Curriculum to Departmental Goals and Preparation of Students

Apart from the benefits to the students, faculty, and the community, graduate activity also strengthens the academic and scholarly functions of the Department, and in turn, the University, regardless of the number enrolled in the program. The work of a faculty member is greatly enriched by the presence of graduate students with whom he/she can teach, interact with, and learn.

Graduate students are an important ingredient in sustaining a regular seminar program and in stimulating and supporting research activities of the faculty. These activities are important for the proper functioning of all our program offerings. The lack of graduate students does not promote a healthy departmental environment. Graduate students have indicated that the quality of our teaching is very high, however, they are very concerned with respect to the lack of a research atmosphere in the graduate program. In the absence of focus and study groups, students feel isolated, and study in their own research area. The seminar program has neither been as active as it should have been nor well attended.

3.2.5 Innovations and Enrichments in Program

The graduate program has recently received a boost with a newly-formed focus group in object-oriented technologies, led by one of our more recent faculty appointees. This group, which includes graduate students and honours undergraduate students, now holds weekly seminars and is actively pursuing funding to support graduate students.

A request has been made to offer a new course, COMP-6761: Introduction to Computational Biology in the next academic year. This course will give an overview of computational problems and algorithms associated with a variety of analyses of biological molecular data.

3.2.6 Collaboration with Other Academic Units and Universities

The department collaborates in various ways with other academic units on campus at the graduate level, from graduate student supervision to serving on supervisory committees and direct involvement with interdisciplinary programs.

Our computing facilities are made available to any graduate student on campus. In particular, this sharing of equipment and working together is evident with several members of our department, and electrical and computing engineering. The very large scale integrated (VLSI) circuits design lab, which is part of the Centre for Digital Hardware Applications Research (CDHAR), a joint research project between these groups, is used by students from all three areas. Their prime objective is to develop existing strategic capacity in digital hardware design specifically in areas of computer architecture, digital systems, and VLSI circuits.

An interdisciplinary M.Sc. Computational Science Program was proposed in 1996 and approved one year later, as a joint initiative of five departments in the Faculty of Science: Chemistry, Computer Science, Earth Sciences, Mathematics and Statistics, and Physics and Physical Oceanography. The Faculty of Engineering and Applied Science is now included as well. This program is operated from the Office of the Dean of Science, however, the current program chair is a faculty member in computer science. Another faculty member serves as departmental representative on the Administrative Committee which coordinates the activities of the program. Computer science faculty are also involved in teaching in this program and have served as supervisors and on supervisory committees for a number of these students.

Several faculty are also involved with supervision of graduate students and undergraduate students at other universities which include Mixteca University of Technology and University of Szeged.

3.2.7 Collaboration with External Partners

The department has little involvement with external partners which focus on graduate education. One strong linkage has been with the Canadian Microelectronics Corporation (CMC) which has provided design workstations and commercial quality software for the design of VLSI circuits. As noted above, these facilities are used by computer science to support graduate research projects as well as for course work.

3.2.8 Student Demand and Enrolment in Courses

As was noted above, and at the time of the writing of this report, the number of students in our graduate program is at a dangerously low point, only four at the M.Sc. level and five in the PhD program. Students from other programs, in particular, computer engineering and computational science register for our courses.

Table 11
Student Demand and Enrollment in Courses

Number Registered in COMP-9000 Maintaining Program				Number of 6000-Level Courses Offered	6000-Level Course Enrolment
		M.Sc.	PhD		
2001	Fall	6	5	3	5
2002	Winter	5	5	-	-
2002	Spring	4	5	1	1
2000	Fall	5	3	5	11
2001	Winter	8	4	6	8
2001	Spring	6	5	1	2
1999	Fall	8	4	6	18
2000	Winter	7	4	3	9
2000	Spring	6	2	-	-
1998	Fall	10	4	6	14
1999	Winter	9	4	6	9
1999	Spring	8	4	1	1
1997	Fall	10	4	5	5
1998	Winter	15	3	5	12
1998	Spring	12	3	1	1
1996	Fall	14	5	4	15
1997	Winter	11	5	5	8
1997	Spring	11	5	-	-

Note: 58 graduate course sections with total enrolment of 119 over six years.

3.2.9 Indicators of Teaching and Program Quality

Through informal communications, graduate students, both current and those who have graduated, were asked to provide input to this report. They indicated that the quality of teaching posed no problems, and felt that the program as a whole was quite robust. However, because the graduate student numbers are small and with few faculty, graduate course offerings are often combined with those at the senior undergraduate level, with supplementary work for the graduate student in order to qualify as a graduate course. Students have indicated that this is not a very desirable arrangement and that more choices are needed, especially courses which are directly related to the students' research areas. It was also noted that further care should be taken to ensure that the comprehensive examinations test breadth of knowledge, and not depth.

3.2.10 Distance Education

The Department offers no graduate courses through distance education.

4.0 Research and Creative Activity

4.1 Areas of Specialization and Strength

The computer science faculty have a wide spectrum of research interests, specializations and strengths, from the deeply theoretical to the highly practical. These include, but are not limited to and in no particular order, expertise in theoretical aspects of computer science, algorithms and complexity, computational geometry, image processing, graph theory, theory of programming languages, database theory, data mining, e-commerce, object-oriented technologies, numerical computations, distributed computing, computational biology, modeling and simulation of discrete systems, modeling and analysis of manufacturing processes, and Petri net-based modeling.

Interdisciplinary research areas include computational aspects of medicine and biology. Computational biology and computational science are developing potential research areas, as are artificial intelligence, simulation and scientific computation.

Over the past five years, faculty have published widely in computer-related journals, in research areas as specified above, including *Theoretical Computer Science*, *Information Processing Letters*, *IEEE Transactions on Robotics and Automation*, *Acta Cybernet*, *SIAM Journal of Computing*, and *Computational Geometry: Theory and Application*, to name just a few.

4.2 Research Groups and Associated Research Units

Our faculty members, for the most part, carry out independent research, often collaborating with researchers at other universities and institutions where sabbaticals are spent. Within the department, the number of faculty in any particular area of research is very small, in some cases, this number is only one, thus making it extremely difficult to form research groups. However, one group has recently formed—the Object-oriented Technologies Group, whose focal point is practical issues in the design, development, implementation and use of object-oriented programming languages and systems. Weekly seminars devoted to recent developments in the field have been organized and they are actively seeking contracts with government agencies and local industry.

The establishment of the Centre for Digital Hardware Applications Research (CDHAR) at Memorial University is a result of collaboration between faculty members from Engineering and our department. The prime objective of this research facility, funded by an ACOA/MUN Research Infrastructure Grant and housed within Engineering, is to develop existing strategic capacity in digital hardware design specifically in areas of computer architecture, digital systems, and VLSI circuits.

There are strong indications that another research group will be formed in the not too distant future in the area of computational aspects of biology and medicine. One of our faculty members is part of a research team as Adjunct Professor at University of Hong Kong involved in the area of computational molecular biology with applications in the field of medicine; another member works in the field of traditional Chinese medicine and acupuncture with others in the Faculty of Medicine at Memorial; while another faculty member collaborates with researchers in the area of computational biology at Memorial, the University of New Brunswick, and the Università degli Studi di Milano-Bicocca. In addition, another faculty member is part of a research team involved in data mining research at the Chinese University of Hong Kong.

4.3 Awards, Honours, and Recognition for Faculty, Staff, and Students

As mentioned, one of our PhD students was the 2002 recipient of an NSERC Postdoctoral Fellowship, “recognizing academic excellence, research ability and potential, and leadership and communication skills.”

Other indicators of recognition of our faculty include evidence of significant participation in conferences at the local, national and international levels, participation as invited members of program committees, chairing program committees and conference sessions, invitations to participate at international workshops, and invitations to contribute chapters in textbooks and authors of monographs. Our faculty also serve as internal and external theses examiners in their area of expertise.

4.4 Research Revenue

Of our 17 tenure-track faculty members, eight hold NSERC grants, for a total of \$168,230 for the 2002-2003 academic year, for a departmental average of \$21,029. One of our faculty members, in the category of applications on the theoretical side, has a renewal grant increase of 53 percent. One faculty member has been an NSERC grant holder since 1978, without interruption. Several others have been in receipt for 18 years.

Table 12
Research Funding Overview (by Fiscal Year)

Year	NSERC		Others	Total
	Number of Grants	Amount		
2002	8	\$168,230	n/a	\$168,230
2001	9	171,445	\$11,927	183,372
2000	9	171,445	20,801	192,246
1999	10	123,750	101,716	225,466
1998	10	162,490	89,442	251,932
1997	10	156,900	89,663	246,563
1996	10	156,900	185,448	342,348
1995	12	172,600	99,067	271,667
1994	9	153,413**	21,389	174,802
1993	9	123,000	398,235	521,235
1992	11	184,594*	6,981	191,575

Notes: * This amount included one conference grant of \$4,000 and an equipment grant of \$38,594.
 ** This amount included an equipment grant of \$28,413.

For the most part, fluctuations in NSERC funding were due to either a faculty resignation, new grantees, or accounts being placed on hold while individuals were on leave.

Other Funding

Over the years, computer science has been successful in obtaining career-related funding to hire undergraduate students to assist faculty in their research projects. These programs are funded by the University or cost shared with the federal government and include:

MUCEP - Memorial University Undergraduate Career Experience Program funded through the Centre for Career Development and Experiential Learning.

SCP/SWASP - Summer Career Placement Program funded through the Employment Services Division of Human Resources Development Canada (HRDC).

Table 13
Other Funding

Academic Year	MUCE P	SCP	SWASP
2001-2002	\$ 4,000	\$ 1,073	\$ 5,850
2000-2001	11,000	2,763	
1999-2000	15,000	2,763	1,381
1998-1999	14,500	2,763	
1997-1998	8,500	3,729	
1996-1997	24,500	4,144	

Under the auspices of the Office of Student Affairs and Services, the School of Graduate Studies and the Graduate Students Union, placements are provided under their program, GRADSWEP - Graduate Student Work Experience Program. There is a limited number of awards (15 or fewer campus wide) and several of our researchers have been successful in their application. One award for \$1,004 was received in 2001-2002 and another for \$952 in 1999-2000.

In recent years, several projects have met with success utilizing funding from outside agencies such as:

Table 14
Outside Agency Funding

Academic Year	ACOA	HRDC/DFO	NRC/IMD
1999-2000	\$56,954		
1998-1999		\$17,179	
1997-1998		30,000	\$4,160

Funding from these programs has provided for equipment purchases, hiring of research assistants, graduate student funding and travel to further research collaboration. Other research funding has come from various sources internal to Memorial, for example, Vice-President Research Awards, Instructional Development Grants, Memorial Research Pool accounts, start up funds for new faculty members, and Dean of Science Internal Awards.

Departmental research links with industry have not been strong. However, there are presently several projects undertaken by individuals during research terms, which do not directly affect funding totals, but partial expenses (lodging, etc.) are paid by third parties.

4.5 Connection between Research and Teaching

The research ethic has been alluded to several times in our goals, in particular goal 3. Research is an essential element in developing and maintaining a quality education program. It includes not only keeping abreast of the field by reading journals, attending and presenting papers at conferences, but also active research to advance the state of the art, or in some other type of scholarly activity to advance personal knowledge. This is particularly important in a discipline which changes as quickly as does computer science. For the most part, course offerings at the 4000-level and graduate level reflect the particular expertise and research area of the instructor.

4.6 Other Indicators of Research and Creative Activity

Initial planning is underway for the hosting of the ACM/POD's Principles of Distributed Computing Conference scheduled for the summer of 2004. This conference, thanks to one of our faculty members responsible for bringing this prestigious conference to Memorial and who is serving as the local organizing chair, will bring together approximately 100 national and international world-class researchers in the area of distributed computing.

An undergraduate textbook in computational biology is in the early stages of development. It is being co-authored by one of our faculty members and another from Università degli Studi di Milano-Bicocca.

In April of this year, we are pleased to note that one faculty member was the recipient of the D.Sc. degree from the Polish Academy of Sciences. Another faculty member will hold the title of Visiting Scholar at the Chinese University of Hong Kong for the next academic year.

5.0 Professional and Community Service

5.1 Service as Journal Editors, Associate Editors, and Members of Editorial Boards

Since the number of faculty that we have is small, and the number who are actively involved in research is even smaller, the contributions in this area are as would be expected, rather few. One faculty member has indicated that he serves as member of the ACM's advisory board for their online review of computing publications. Another serves on the Technical Advisory Committee of the Canadian Microelectronics Corporation (CMC). A number of faculty serve on the program committees for international conferences.

5.2 Service as Invited Reviewers

The list of computer-related journals for which our faculty serve as invited referees is quite extensive. They will not all be included in this section in their totality as they are included in the individual faculty member's curriculum vitae which can be found in Appendix E.1.

A partial list includes the following journals:

<i>Theoretical Computer Science</i>	<i>Journal of the ACM</i>
<i>Journal of Computational Biology</i>	<i>NSERC Grant Proposals</i>
<i>ACM Transactions on Database Systems</i>	<i>NATO Research Grantee</i>
<i>IEEE Transactions on Software Engineering</i>	<i>Information Processing Letters</i>
<i>IEEE Transactions on Computers</i>	<i>Contract Proposals for CMC</i>
<i>IEEE Transactions on Parallel and Distributed Computing</i>	
<i>International Journal on Artificial Intelligence and Pattern Recognition</i>	

5.3 Collaborations with Government and Industry

On the whole, the department has had limited collaboration with industry and government agencies. However, Memorial University is a founding member of the Canadian Microelectronics Corporation (CMC), with the department serving as the primary contact between CMC and the University. CMC provides design workstations and commercial quality software for the design of large scale integrated circuits. All equipment, software, and other resources available to Memorial, are housed either in computer science or engineering, and for the most part, are maintained by our systems support staff. These facilities are used primarily by researchers and students in computer science, electrical and computing engineering, for both undergraduate and graduate research projects and course work.

Several faculty are actively involved with small computer-related businesses in the community and with the Institute for Marine Dynamics (IMD), part of the National Research Council facility located on campus, consulting and collaboratively working together to build long-term relationships. Sabbatical leaves are also spent with these companies, as well as one is planned to be spent with IMD. Other collaborative work is on-going with Marine Institute, which is part of the university, in the area of computer simulation.

5.4 Connections between Service and Teaching

Our associations or partnerships with government agencies have resulted in the department benefiting by the provision of certain types of hardware and software for graduate and undergraduate students' use in doing assignments and projects. Otherwise, access to equipment of this type would not have been available to them, and likewise, we would not have been able to offer courses in these areas.

Faculty involvement with various businesses has provided them with an insight to the particular needs of industry with respect to computer science majors, and to then incorporate this information into their respective course offerings. It brings in feedback regarding our programs. Opportunities sometimes become available for our students to do projects with these businesses, teaching professional responsibility through example. Relevant case studies are brought to the classroom.

5.5 Other Aspects of Service

Members of our systems support staff formed a Linux User's Group, which holds seminars on a regular basis. These are held in the department, during evening hours, thus making them available to professionals in the area. These seminars are well attended and enable individuals to learn about recent happenings in the local and national Linux environment.

In May 2002, several faculty and a member of the systems staff offered three mini-enrichment courses to approximately 30 junior high school students in conjunction with the Avalon East School District enrichment program. The content of these courses focussed on "Algorithm Design and Analysis," "How the Computer Helps our Understanding of the World," and "Internet Publishing Overview." The department has been involved with this program several times in past years. They are well received.

Some members of faculty are also involved in mentoring programs with senior high school students. One group recently did extremely well at the regional science fair, and went onto further competition at the national level. Several members of the department also serve as judges at local science fairs, assist with high school interviews and visits, and are active participants in the annual Faculty of Science Open House.

We also have members of staff who devote a considerable amount of their time to activities with scouting and orienteering, at the local, provincial and national levels, often making use of their computer expertise to support various activities in these organizations. As an example, an on-going project includes the development of software that will make maps in the field for the local orienteering group, interfacing a global positioning system with a handheld computer. This software will be made available to national orienteering organizations.

6.0 Department Organization and Human Resources

6.1 Administrative Organization

6.1.1 Administrative Positions

Administratively, computer science at Memorial University is a department within the Faculty of Science with a Head, who reports to the Dean of Science. The headship position has been vacant since August 31, 2001. The Dean served as Acting Head for a short time at the beginning of the 2001-2002 academic year. Subsequently, a former Head of Department, now retired from the University, assumed the position of Interim Head on a part-time basis. The search in the 2001-2002 academic year was carried out by an outside agency. Three interviews for the headship position were held in Winter 2002, the results of which are still pending. Currently, there is no Deputy Head of Department.

It should be noted that the recent headship interviews were a continuation of a search that was initiated in September 1999, for appointment in September 2000. When no appointment was made, the head at that time was extended for one further year. One of the recommendations in the report of April 2001 was that the search process be reinitiated.

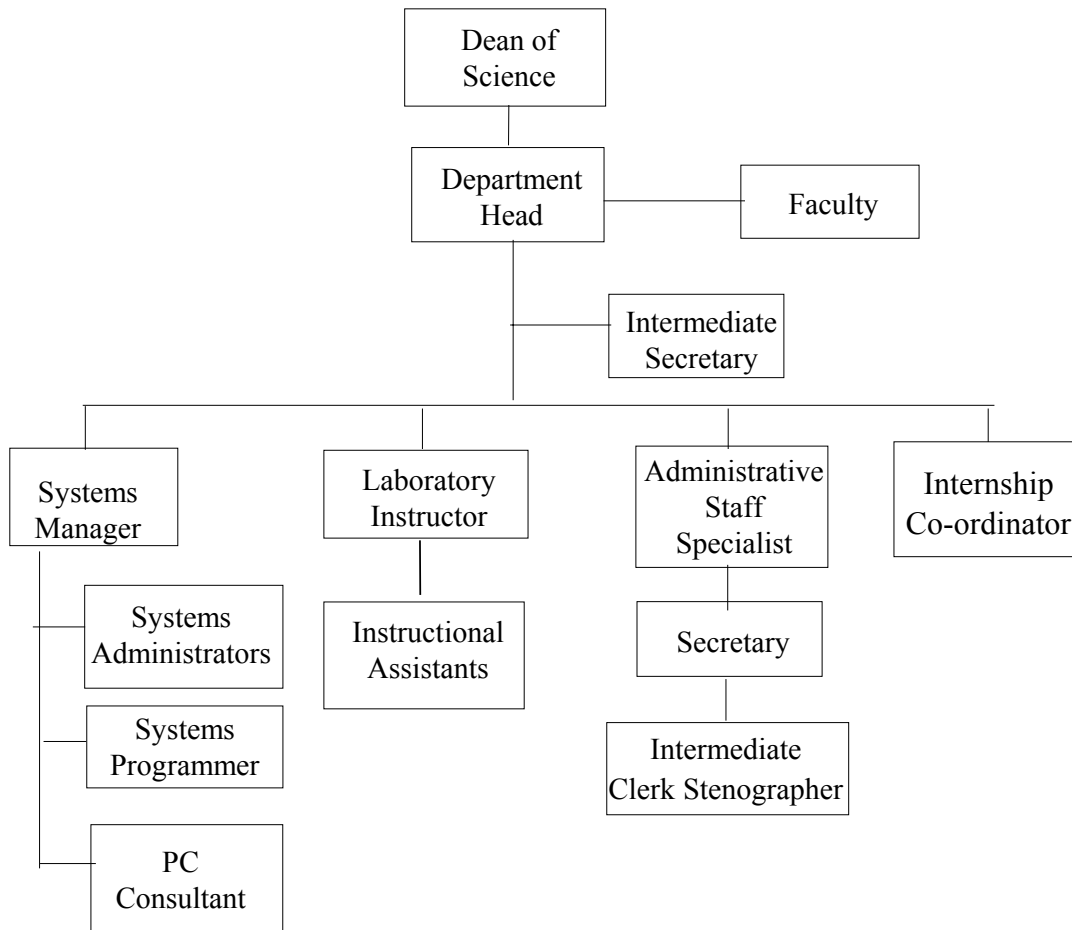
The department has a committee structure in place—Undergraduate Studies, Graduate Studies, Promotion and Tenure, and Search, to name a few. Each committee has a chair who reports to the head in an advisory capacity. Membership on the committees is by election and/or appointment, depending on the committee, and is normally for a period of one academic year.

Within the department, there are four members of staff who carry out administrative tasks—the Administrative Staff Specialist, the Secretary to the Head, the Systems Manager and the Laboratory Instructor. The Administrative Staff Specialist also serves as the Graduate Studies Officer. People holding these positions report to the department head.

6.1.2 Reporting Structures

The departmental internal reporting structure is as follows, with the Head of department reporting to the Dean of Science:

Table 15
Department Reporting Structure



6.2 Faculty Information

6.2.1 Number and Type of Appointments

There are currently 17 tenure-track faculty positions within the department, all tenured except one. These include eight full professors, six associate, and three assistant (one assistant professor will be promoted to associate September 1, 2002). A former faculty member, now at the University of Windsor, holds an adjunct professor position; there is one cross appointment with a professor from the Faculty of Business Administration on campus, who actively participates in graduate supervision. In addition, the department has three contractual faculty members who hold the rank of lecturer. On a semester basis, a number of per-course appointments is also made. For the next academic year, it is anticipated that nine per-course appointments will be made. In addition, some faculty will be teaching for extra pay, which will enable the department to offer a reasonable slate of courses. Faculty who teach an extra course have the option of receiving remuneration

directly, or having this money deposited in a research pool account where it can be accrued for research purposes.

Three faculty members have been granted sabbatical leave for the 2002-2003 academic year, while a fourth has received a leave of absence without pay, thus bringing the number down to 13 tenure-track positions, making it virtually impossible to offer a full complement of courses, let alone do program development. In the previous academic year, in each of the fall and winter semesters, there were six faculty on leave. Students were given few options with respect to course offerings.

Three of our faculty members are former graduates of our program, who then went on to pursue their PhD work at another university, returning to Memorial to assume tenure-track positions. Two of our contractual appointees are also graduates of our program.

6.2.2 Listing of Current Faculty Members and Credentials

- Professors: Miklos Bartha, M.Sc., PhD
Paul Gillard, B.Sc., M.Sc., PhD
Siwei Lu, B.Eng., M.Sc., PhD
George Miminis, B.Sc., M.Sc., PhD
Jian Tang, M.Sc., PhD
Krishnamurthy Vidyasankar, M.Tech, PhD
Cao An Wang, BA, M.Sc., PhD
Wlodek Zuberek, M.Sc., PhD, D.Sc.
- Associate Professors: Ed Brown, B.Sc. (Hons.), M.Sc., PhD
Rod Byrne, B.Sc. (Hons.), B.Eng, M.Sc., PhD
Ashoke Deb, M.Tech., PhD
A. (Tony) Middleton, B.Sc., M.Sc., PhD
Norman Rehner, BA, M.A., PhD
John Shieh, B.Sc., PhD
- Assistant Professors: Adrian Fiech, Diplom-Informatiker, PhD
Manrique Mata-Montero, B.Sc., M.Sc., PhD
Todd Wareham, B.Sc. (Hons.), BA, M.Sc., PhD
- Adjunct Professor: Xiaobu Yuan, B.Sc., M.Sc., PhD
- Lecturers: Donna Batten, B.Sc. (Hons.), M.Sc.
Radha Gupta, BA (Agra), BA (MUN), M.S.
Malgosia Zuberek, B. Eng., M.Sc.
- Cross Appointment: Jeff Parsons, B. Comm (Hons.), PhD

6.2.3 Visiting Faculty

There have not been any visitors to the department in recent years who have held the official title of Visiting Faculty Member. Although not officially approved as visiting faculty, a faculty member from the University of Waterloo is currently spending his sabbatical year with us.

Individuals have been hosted on campus for research collaboration on specific research projects, sponsored by NSERC operating grants, but who have received no official recognition.

In August of this year, three scholars from the National University of Defence Technology in China will be in our department for three days for collaborative research purposes with a member of faculty. During their visit, they will also present a seminar.

6.2.4 Major Complement Changes

Seven years ago, in 1995, the department had 17 full-time faculty members and five contractual appointees (see Appendix E.2). Today, the number of full-time faculty remains at 17, while the number of contractual appointees has decreased by two, which in terms of availability of faculty to teach, amounts to a loss of a minimum of eight course equivalencies per academic year, which is most significant. The last tenure-track appointment was made September 1, 1999. Prior to that, there were two appointments made in 1994. Although there have always been problems in recruiting new faculty, retainment of faculty has not been perceived as being as serious. One faculty member resigned in 2001—he currently holds the position of adjunct professor. The last search for a new faculty member was carried out in 1998 and resulted in the hire made September 1, 1999.

6.2.5 Faculty Age and Retirement Profiles

The average age of our 17 tenure-track faculty members is 52 years. The average age of our professors, associate and assistant professors is 55, 53, and 42, respectively. The first retirement, at the mandatory age of 65, will be in two years time from the associate professor rank. (However, if they would choose to do so, 9 of our 17 faculty, or 53 percent, are currently eligible to retire.) In four years time, or in 2006, there will be two normal retirements, one from each of the professor and associate professor ranks, followed two years later by two professors. Thus in seven years time, or in 2009, five of our current faculty, or 29 percent, will no longer be with the department because of having reached the mandatory retirement age.

Table 16
Faculty Retirement Profiles

Eligible for Retirement	Professor	Associate Professor
2004		1 retirement
2006	1 retirement	1 retirement
2008	2 retirements	

6.2.6 Workloads

The normal amount of teaching assigned to a faculty member in an academic year is referred to as the “teaching norm” and is defined in the current Collective Agreement between the Faculty Association and Memorial University as four (the number of three-hour lecture course equivalents per academic year) for the Department of Computer Science. In determining course equivalencies, a number of other factors is taken into consideration including, for example, student supervision, laboratory supervision, teaching and/or developing a new course, and co-ordination of a multi-section course.

The teaching norm can be increased per academic year for those faculty members who are not actively involved in research and for those holding appointments at the rank of lecturer. The Dean of Science can decrease the teaching norm by one course equivalency per academic year in order for a faculty member to pursue research. For the next academic year, one of our members received this recognition.

Teaching assignments must be made at least two months prior to the start of the academic year, at a time when graduate course offerings are not usually known. However, provision is made for adjusting the assigned workload at a later date, if necessary. Care is taken to ensure that each member of the department is assigned a full workload per academic year. With a shortage of faculty, and taking into account that in any given academic year, three faculty may be on sabbatical leave, the required course offerings can only be met by contractual appointments, per-course appointees, and faculty who choose on occasion to teach an extra course for extra remuneration.

6.3 Support Staff Information

6.3.1 Number and Type of Staff

There are currently 16.5 full-time staff positions in the three categories of Administrative Support Staff, Instructional Support Staff, and Systems Support Personnel, as specified in Appendix E.3. There is currently one vacant position, PC Consultant, in the Systems Support Group.

6.3.2 Major Changes in Staff Complement

The total number of support staff positions has not changed considerably over the past seven years, an increase of 2.5. This increase is reflected in the appointment of a coordinator, on a half-time basis, to support our internship program, and two additional positions with systems support staff, a reflection that this group is doing more in-house software development and taking on more responsibilities campus wide. To support the systems group, the department has been hiring internship/co-op students from computer science and computer engineering, respectively, as well as our senior undergraduate students.

6.3.3 Profile of Positions

The support positions in the Department of Computer Science are categorized into three groups: administrative, instructional, and systems support.

In 1978, the Computer Science Group became a separate unit within the Faculty of Science. At that time, one clerical position was transferred to service the group. In 1980 and 1981, two more clerical positions were established to support the needs of a growing faculty complement, research support, and a large undergraduate student population. In 1988, a fourth position was established.

The administrative support team now consists of the following positions:

- C an intermediate secretary who provides secretarial services to the head of department, with particular responsibility for Promotion and Tenure, and Search Committees;
- C the general office staff—a secretary and an intermediate clerk-stenographer, who provide clerical support for all members of faculty and act as the initial contact for student enquiries; and
- C an administrative staff specialist II who acts as an advisor to the head of department, members of faculty and staff. As well, matters relating to budgets, adherence to university policies and procedures, grant and contract accounts, and graduate studies are among the duties of this position.

In 1997, a half-time internship co-ordinator position was created to service the needs of the CHIO program, which provides a liaison for industry and student job placement.

The instructional support team, in the early years of the department, provided system support as well as instructional support, but growth and need for full-time positions in both areas led to a separation into two areas. The instructional support group now has a laboratory instructor and three instructional assistants who provide laboratory support,

work with faculty to update lab sessions, meet with students who have questions pertaining to 1000- and 2000-level courses and provide some marking support.

The systems support group, which has grown to seven positions, services all system needs with regards to instruction, research, student usage and general system support for the department. One and one-half of these positions have been seconded to the Department of Mathematics and Statistics, but all members of the group work together to provide a high level of computing resources and facilities. As mentioned elsewhere in this report, our systems support staff work closely with many other departments and groups on campus.

Nine members of the system support and instructional support groups are graduates of Memorial University.

6.3.4 Age and Retirement Profiles of Staff

There are no normal retirements, age 65, within the staff personnel until the year 2014. However, should staff members opt to take their earliest retirement date, then there is the possibility of one each in 2003, 2007, and 2008. The average age of the current members of staff is 41, and of the Administrative, Instructional, and Systems Support Staff, the average age is 43, 41 and 39, respectively.

7.0 Financial Support

7.1 Change in Operating Funds Over Time

The overall departmental budget allocation for the time period 1995 to 2001 is given in Appendix F. Budget requests are submitted to the Dean of Science well in advance of the start of the fiscal year, and currently are for a three-year period. The amount of funding that the department is then allocated for the fiscal year is made known to the head, when the University receives its budget from the Provincial Government. On occasion, this can be well into the next fiscal year, which is not conducive to forward planning.

Increases to the salaries portion of the departmental allocation are a reflection of changes to the faculty and staff collective agreements with regards to salary increases. Fluctuations to the salary component have occurred with respect to the number of faculty on leave, the number of per-course appointments required, or extra teaching for specific years.

As for our operating component, the major slices of the pie go for student assistant salaries, telecommunications, materials and supplies (which includes minor equipment repairs and purchases, and printing supplies). Severe restraints have been placed on our operating budget. It may appear that the department is spending more on operating now than in the past, however, this is simply a

reflection of the movement from capital to operating to cover minor computer purchases, and laboratory and office furniture.

As can be seen in Appendix F, capital spending has been drastically reduced. However, our submissions for new computer equipment, have for the most part been positively received. Our undergraduate labs were upgraded in this academic year and have the latest available technology.

7.2 External Sources

External sources for funding have been very limited. However, the department has benefited from our affiliation with government agencies for the purchase of computing equipment and/or donations in kind. This equipment is used to support faculty and graduate student research as well as being used for teaching purposes.

Information on faculty research support in general is included in section 4.4 in this report.

7.3 Scholarships, Teaching, and Research Assistantships Provided to Students

On a semester basis, the department hires undergraduate students for the most part, and graduate students where possible, primarily as markers and laboratory demonstrators. The department takes advantage, whenever possible, of all government-funded programs to hire students for summer employment (see Section 4.4). There are seven students working in the department this summer carrying out various projects, with faculty and systems personnel. Some are fully funded, most are on a cost-shared basis. Grant holders hire students to work on aspects of research projects. The department has no other source of funds to support financial assistance to students.

8.0 Physical Resources

8.1 Laboratories and Computing Equipment

Because of a lack of space, the department houses only five research laboratories—a computer vision lab, parallel systems lab, human-computer interaction lab, graphics lab, and a VLSI design lab, some of which are also used for teaching purposes. Each of these facilities has unique computing equipment to meet the particular research needs that are carried out in these areas. However, the department needs to reevaluate the functions and usage of each of these facilities and to make changes where necessary.

It is felt that the Department of Computer Science has ample computer resources to handle the current level of academic needs of the faculty, staff, and students. These resources include a wide range of software for both the Linux and Windows '98 operating systems, and a large number of computer workstations in general access and specialized labs. The department also shares its

resources with other academic units on campus, in particular the Department of Mathematics and Statistics. Descriptions of available hardware and software resources are included in Appendix G.

As a service to the entire University community, the Department of Computer Science, in collaboration with the Department of Computing and Communications, undertook a joint project to develop a method of delivering a consistent login environment across campus. Foremost in the design of this system was security and robustness of the unattended workstation. (At present, it is virtually impossible for one computer user to do anything to the computer system that would compromise the session of the next user of the computer.) There are more than 500 computers on campus which come under the jurisdiction of our systems support personnel.

8.2 Library Resources

(Provided by the Library)

8.3 Space: Current and Projected

The department is located in the west wing of the S.J. Carew Building, on the first and second levels. Faculty and administrative offices are primarily on the second level, with faculty research laboratories located in the interior section of the same level. Instructional assistants, systems personnel, and graduate students are housed on the first level, as are servers and other computer-related equipment. Computer laboratories are located in various buildings around campus.

The department was moved to its current location in January 1995. The amount of space provided at that time was considered to be inadequate. It remains inadequate. Faculty office space is at a premium, with some faculty asked to move from one office to another on a yearly basis, depending on who is off on sabbatical for any given year. The most recent faculty appointee (September 1999) still has no permanent place to hang his hat. Requests have been made to the Faculty of Engineering for additional office space over the years, however, this request has never been accommodated. Some members of the department were upset when a portion of our seminar room was recently taken to accommodate a faculty office. It was felt that more of an effort could have been made to find other accommodation. This was done, however, no other office space was made available. The space issue is further complicated by the fact that the Dean of Science, to whom the department head reports, does not control the allocation of space in the building in which we are housed.

The department has only five research laboratories. More are required, depending on the research interests of new appointments. Likewise, the problem of office space must be addressed prior to new faculty appointments. Undergraduate students do not have a room that they can call their own, and graduate student space is very limited.

Faculty offices are spacious, however, this is not all useable space. The area to which computer science was relocated had previously housed the Department of Earth Sciences, with faculty office space designed to meet their particular needs, that is, lab space within general office space. The plumbing and other laboratory fixtures, which take up a fairly large portion of many offices, were not removed because of the exorbitant costs to do so.

The building in which we are housed is known as the Engineering Building. The department has very little visibility. Signage to indicate that computer science is housed within the building is almost nonexistent. It appears that this is trivial and could be readily changed, however, this has not been the case. One gets the feeling of being the unwanted house guest who never leaves.

If the Department were to strengthen significantly its intake of graduate students over the next several years, which is one of its priorities, then the problems associated with their accommodations and research laboratories must be addressed.

There are classrooms located on the first level of our wing, which are allocated by the Faculty of Engineering or the Office of the Registrar. The department has no classroom space which it controls and which could be hard-wired to our computing facilities to be used as a multimedia facility. Space to accommodate a student help centre is also a necessity.

Our undergraduate laboratories are located within our wing, as well as at various locations across campus. This is not seen as a problem. These are well equipped and maintained, and if not being used for scheduled laboratories, they are available to any student on campus, up to 15 hours per day.

8.4 Shared Facilities With Other Academic Units

The Department of Computer Science shares its computing resources, teaching and general access labs with other academic units on campus, primarily with the Department of Mathematics and Statistics, and more specifically, with respect to the Beowulf cluster as indicated in Appendix G. Computing resources are also shared with the Schools of Social Work, Human Kinetics and Recreation, and Graduate Studies, the Departments of Chemistry, Physics and Physical Oceanography, and Computing and Communications, and the Faculty of Education. Other academic units may soon be added to this list. This is accomplished through the use of in-house automated system administration tools developed by members of our systems group. The department also shares some computing resources with the Faculty of Engineering and Applied Science, specifically those which support VLSI research. All resources are maintained by our systems support group.

All labs have a printing system in place that supports cost recovery. They boot the Windows '98 and Linux operating systems, meaning that all available software runs in all labs. The systems group is currently working on providing Windows 2000 support to all users.

9.0 Future Plans

The future of the Department of Computer Science at Memorial University will undoubtedly be influenced by the appointment of a new Head of Department and the amount of support provided by senior administration. The delay in making this appointment has been detrimental to the department as a whole. Presently, the department lacks a sense of community and working together. Morale is at a low point. There is a very low level of responsiveness from faculty. All of this appears to have filtered down to our students who have expressed their concerns in the student survey carried out by CIAP. To have a unified department, which assumes a leadership role in the university community, and where students are a top priority, will be a challenge for the next Department Head.

Excellence in teaching, developing and maintaining a well-balanced curricula, the use of good instructional techniques, and access to well-equipped computing laboratories, must continue to be major guiding factors in the activities of the department.

9.1 Initiatives and Activities for the Next Seven Years

In the absence of a Head, this section is difficult to write. To a large extent, the content of this section is a reflection of the comments put forward by some members of faculty, staff and students, both undergraduate and graduate. These issues are long standing. They have been requested on numerous occasions by the department head of the time, and would be included again, regardless of who occupies the headship position. These are not stand-alone issues. They are all interrelated and are critical if the department is to move forward assuming a leadership role. Without positive action, the departmental initiatives and activities over the next seven years will be minimal.

Faculty Recruitment

It is most discouraging to members of our department to hear of other Canadian departments of computer science being given the mandate to recruit new faculty on a very large scale. Many departments are having new accommodations being built for them. This is certainly not the case at Memorial. As was noted several times within this document, the department is currently very understaffed and is in need of additional faculty who will bring new ideas and new research programs and/or reinforce those programs already in place, to strengthen the research efforts of the department, and to provide graduate supervision. The department has no major research groups defined, thus research is distributed and carried out on a very individual basis. The formation of research focus groups is critical. Likewise, without additional faculty, our undergraduate programs are also in jeopardy as we do not have sufficient faculty to offer all existing courses, let alone do program development and revisions.

A faculty of at least 25 tenure-track positions would be ideal. These appointments can be spread out over the next several years, but for the department to begin to move forward, a minimum of

three must be made in the next two years. The remaining ones should be made as soon as possible, so as not to slow the rebuilding process to a snail's pace. Replacements for retirees must also be taken into consideration. The recent budget submission requested the appointment of three additional faculty over the next three years.

As an item of interest, a survey of Canadian computer science departments carried out in 2002 and covering the 2001-2002 academic year, shows that of the 22 computer science departments that provided information, Memorial ranked 18th in terms of the number of full-time faculty. We were in the 21st position in terms of starting salary for a fresh PhD. Within Atlantic Canada, four universities reported information. Memorial (17) ranked third in terms of the number of tenure-track faculty, well behind Dalhousie University (29) and the University of New Brunswick (24.5). In terms of starting salary, we were at the bottom of the heap, but starting salaries were more comparable with those at University of New Brunswick (\$58,000) and Acadia (\$55,000), with Dalhousie in first position (\$69,000).

The reinstatement of a Visiting Professorship program should also be given serious attention.

Space

The need for additional space is critical, as was detailed in section 8.3, for faculty offices, research labs and graduate students. It is most important that any additional space allocated to the department be in the same general area as current space.

Graduate Program

The computer science graduate program has lost its momentum, which is evident by the decreased number of students currently in the program and the intake forecast for the next academic year. Without a doubt, this program desperately needs strengthening. Funding is needed to support graduate students, postdoctoral fellows, and infrastructure. Funding from the university to support an increase in the number of graduate students is, without qualification, a given. This must be done before the numbers are at a point where the programs would be impossible to revitalize. Without a viable graduate program, the department will be unable to attract and recruit highly-qualified faculty.

Discussions were recently held with the Interim Dean of Graduate Studies to initiate an increase to our baseline allocation. The department will make more of an effort to employ graduate students where possible, however, this would also require additional funding in our departmental budget allocation. To be in competition with other graduate schools, we need to offer a better and more attractive financial package. Applications to our program must be processed more quickly.

Seminar Program

The computer science seminar program also needs to be revitalized. A regularly scheduled seminar series in which we not only hear about research done by speakers from outside but also where our own research activities, by faculty and graduate students, are discussed. This program has an obvious impact on all of our goals.

Undergraduate Program

(i) Student Help Centre

The department has no facility providing support to students outside of regularly scheduled class and lab times, and faculty and instructional assistant office hours. Efforts must be taken as soon as possible to establish a computer science student help centre, available to any student enrolled in a computer science course. Staffing of this facility could be handled to a great extent by hiring senior-level undergraduates. As for supervision of the facility, the new Head may wish to consider the possibility of having an individual who would not only have involvement with the centre but also would be involved with student advising. The creation of this facility would, in our opinion, go a long way to help to improve our graduation results and decrease the large number of students who fail computer science courses each semester.

(ii) Program Review

A thorough review of all undergraduate courses and programs, including multi-disciplinary programs and service courses, must be carried out with proposed changes systematically incorporated into the curriculum, at all levels, and in a timely fashion. Courses tailored to meet the needs of other academic units must be changed accordingly. New courses must be brought on-stream to reflect current trends in the discipline; outdated courses must be deleted.

Our curriculum needs to be made more attractive from the students' point of view with the possible inclusion of more technology-oriented courses and more emphasis on programming. Our current majors have indicated that there is an insufficient amount of practical learning in our programs. Our honours programs are under-subscribed. Information sessions, where students are told of the various aspects of each program, would be most beneficial.

There are no courses which are tailored specifically to meet the needs of our undergraduate disciplinary programs which may be making them somewhat unpopular. Stream specialization may be needed.

(iii) Distance Education

It is also important that the department take a more active role in offering courses through distance education. We offer only one course through this format—that is a service course. The possibility for adding strength in this area must be undertaken as soon as possible. This is not limited to the undergraduate program but includes graduate programs as well.

9.2 Collaboration with Other Academic Units and Universities

The department has limited contacts outside the department and this area definitely needs to be explored and strengthened. We will continue to collaborate with other academic units and universities with whom we have done so in the past. However, for new collaboration to take place, it is desirable that all concerned promote the department more positively and more widely to the entire university community, the local community and beyond. Members of other academic units need to be made aware of the computing expertise available within the department, from our faculty, staff and students.

The possibility exists for new multi-disciplinary programs, at the undergraduate and graduate levels, to be developed with the Faculties of Education and Medicine at Memorial, and these avenues must be explored. As well, degree programs need to be encouraged with respect to information technology with the Faculties of Arts, and Business Administration. A better working relationship with the School of Continuing Education, with respect to their information technology diploma program needs to be formed.

10.0 Additional Issues

10.1 Issues for Which Computer Science Desires Advice

A number of issues were identified in the previous section for which the department and the next Head will require immediate advice, financial support and positive action. They will not be repeated here. Further items which will be elaborated upon, and which require advice/action, concern members of our systems support staff and the promotion of computer science at Memorial.

Systems Support Personnel

Members of our department and other academic units on campus have access to a wide range of departmental computing resources and system administration tools. This has been made possible because of our dedicated and highly qualified systems support staff. Retention of these individuals is of paramount importance for the future and continued success of the department and the University. Many times, over the past number of years, the department has trained, then lost,

excellent systems personnel because of the lower salaries paid by the University to our staff in comparison with industry and other units on campus. All systems personnel currently receive a market differential that does help to boost their annual rate of pay; however, the rate of market differential is determined on a yearly basis and is not guaranteed.

It is essential that the Department of Human Resources re-evaluates these job classifications in light of the increase in the scope of the departmental computing mandate, as soon as possible. Our systems people have, of their own initiative, developed a system of highly structured, all-encompassing automated system and management tools that are being used successfully in 11 labs across campus with a user community of approximately 7,000. Our systems people work alongside their peers from the Department of Computing and Communications, providing support for the entire University community spanning multiple faculties and departments, but are not on an equal footing in terms of salary and classification. Clearly, they should all be classified and compensated according to their level of responsibilities and the technical skills required of them, regardless of their home base.

Visibility

In section 8.3, it was noted that the department is located in what is popularly known on campus as the Engineering Building, physically distant from those units with which we have the most contact. As a minimum, there needs to be recognition and acknowledgement of our presence within this building.

There is a need for computer science at Memorial to be promoted more widely than is currently being done, in terms of our undergraduate and graduate programs, the computing expertise, and the research and development capabilities of our members. Granted, we need to promote computer science ourselves, however, we also need the assistance of the University. At the local level, several members serve on community committees that are in need of computer expertise and advice, but this is not widely known. If increased, it could lead to more research possibilities for our faculty and students, and possible future employment for our majors. Likewise research partnerships need to be formed with the private sector in order to enhance and develop effective long-lasting relationships.

In order to attract more students to our programs, students across the country need to be made aware of the varied and many programs that we offer. Efforts are currently underway to provide this information to incoming students at Memorial for fall semester, and to those registered in 1000- and 2000-level courses, through distribution of brochures and holding of information sessions. The department will again publish an annual report, with wide distribution. Plans are underway to hold public lectures in the next academic year. And it has been suggested that a research forum should also be held. But this is only the beginning. Much more can and needs to be done.