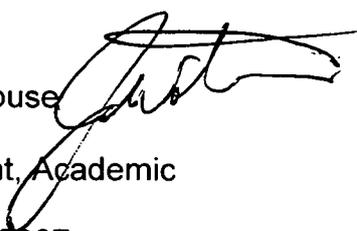# SIMON FRASER UNIVERSITY

Senate Committee on University Priorities
Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: Proposal for a Joint Major and a Joint Honors program in Computing Science and Philosophy in the Faculties of Arts and Social Sciences, and Applied Sciences (SCUP 07-06)

DATE: February 14, 2007

At its February 7, 2007 meeting SCUP reviewed and approved the proposal from the Faculty of Arts and Social Sciences and the Faculty of Applied Sciences for a Joint Major and Joint Honors program in Computing Science and Philosophy.

Motion

That Senate approve and recommend to the Board of Governors, the proposal for a Joint Major and Joint Honors in Computing Science and Philosophy in the Faculty of Arts and Social Sciences and the Faculty of Applied Sciences.

encl.

c: O. Schulte

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate Committee on University Priorities

From: B. Krane, Chair
Senate Committee on Undergraduate Studies

Subject: Curriculum Revisions
Faculty of Applied Science/Arts and Social Sciences (SCUS 06-39d)

Date: **12 December 2006**

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of 5 December 2006 gives rise to the following recommendation:

Motion:

> "that SCUP approve and recommend to Senate the Joint Major and Honors program in Computing Science and Philosophy."

The relevant documentation for review by SCUP is attached.

Joint Major and Honors Program in Computing Science and Philosophy

O. Schulte and B. Hadley

January 25, 2007

1. Introduction

A B.Sc./B.A. degree program (major or Honors) is proposed as a joint program of the School of Computing Science and the Department of Philosophy, to be administered under the Faculty of Applied Sciences. There is a natural intellectual affinity between Computing Science and Philosophy. The commonalities shared by these disciplines consist largely in the very substantial amount of logical inference and abstract conceptual organization required in both fields. The ability to reason clearly, and to formulate plans for creating complex, coherent, and logically correct systems will be mutually reinforced by training which would be given in each of the two disciplines. An appreciable number of students taking Computing Science already take Philosophy courses. The proposed program is an excellent fit for the curriculum reform initiative at SFU, combining as it does a rigorous training in quantitative, technical and formal skills, much exposure to analytic and essay writing, and a great breadth of topics and methodologies from both the humanities and the information sciences.

Studies consistently show that philosophy majors are among the top of the humanities and social sciences as far as their employment and earning potential is concerned (with many pursuing a career in the information technology industry), at a level comparable to biology majors in the sciences. Moreover, in polls a clear majority of business leaders assert that the ideal preparation for the leaders of tomorrow is a combination of analytical and communication skills together with a solid technical background. This is the kind of leadership training that the proposed joint program will provide.

Joint Major and Honors Program in Computing Science and Philosophy

O. Schulte and B. Hadley

February 7, 2007

2. Proposed Calendar Description - Applied Sciences Entry

The following text is proposed to be placed in the *School of Computing Science* section under *Faculty of Applied Science*.

Joint Major and Honors Program in Computing Science and Philosophy

The School of Computing Science and the Department of Philosophy cooperate in offering a Joint Major and a Joint Honors program. The administrative home is within the Faculty of Applied Science for purposes of student registration, appeals and graduation processing. Interested students should contact advisors in both the Department of Philosophy and the School of Computing Science. Permission to enrol in the program must be obtained from both the Department of Philosophy and the School of Computing Science.

Program requirements below include sections labelled CMPT Requirements and PHIL Requirements. The requirements under these sections are intended to track corresponding requirements within the CMPT and PHIL Major programs, respectively.

Joint Major Program

Lower Division Requirements (50-54 credits)

MATH 151-3 Calculus I
MATH 152-3 Calculus II
MATH 232-3 Elementary Linear Algebra

and one of
STAT 270-3 Introduction to Probability and Statistics
BUEC 232-4 Data and Decisions I

and one physical science chosen from the list of physical sciences electives for the computing science lower division requirements.

CMPT Requirements

CMPT 120-3 Introduction to Computing Science and Programming I*
CMPT 125-3 Introduction to Computing Science and Programming II*

4.

CMPT 150-3 Introduction to Computer Design
CMPT 225-3 Data Structures
CMPT 275-4 Software Engineering
MACM 101-3 Discrete Mathematics I
MACM 201-3 Discrete Mathematics II

*CMPT 126-3 may be taken in lieu of CMPT 120-3 and 125-3.

PHIL Requirements

Students are required to complete at least 16 credit hours of lower division credit including one of

PHIL 100-3 Knowledge and Reality
PHIL 120-3 Intro Moral Philosophy

and one of
PHIL 150-3 History of Philosophy I
PHIL 151-3 History of Philosophy II

and all of
PHIL 201-3 Epistemology
PHIL 203-3 Metaphysics
PHIL 210-4 Deductive Logic

Upper Division Requirements (44 credits)

CMPT Requirements

CMPT 300-3 Operating Systems
CMPT 307-3 Data Structures and Algorithms
CMPT 310-3 Artificial Intelligence Survey
CMPT 354-3 Database Management Systems

and one of
CMPT 320-3 Implications of a Computerized Society
PHIL 320-3 Social and Political Philosophy
PHIL 321-3 Moral Issues and Theories

and one of
CMPT 383-3 Comparative Programming Languages
CMPT 384-3 Symbolic Computing

and one 400 level course from the AI concentration (see *Computing Science*)

and one 400 level course from the theoretical computing science concentration (see *Computing Science*)

PHIL Requirements

5.

A total of 20 upper division Philosophy credits are required, including
PHIL 341-3 Philosophy of Science
PHIL 344-3 Philosophy of Language I
PHIL 343-3 Philosophy of Mind
at least one 4-credit 400 level course

For a B.A. from the Faculty of Arts and Social Sciences, students must fulfill the Faculty of Arts and Social Sciences requirements, such as the Breadth Requirements. For a B.Sc. from the Faculty of Applied Science, students must fulfill the Faculty of Applied Science requirements, such as the Residency Requirements. The University's QBW requirements must be met as well for either Bachelor's Degree.

Students are encouraged to enrol in the Cooperative Education program.

Joint Honors Program

Lower Division Requirements (53-57 credits)

MATH 151-3 Calculus I
MATH 152-3 Calculus II
MATH 232-3 Elementary Linear Algebra

and one of
STAT 270-3 Introduction to Probability and Statistics
BUEC 232-4 Data and Decisions I

and one physical science chosen from the list of physical sciences electives for the computing science lower division requirements.

CMPT Requirements

CMPT 120-3 Introduction to Computing Science and Programming I*
CMPT 125-3 Introduction to Computing Science and Programming II*
CMPT 150-3 Introduction to Computer Design
CMPT 225-3 Data Structures
CMPT 250-3 Introduction to Computer Architecture
CMPT 275-4 Software Engineering
MACM 101-3 Discrete Mathematics I
MACM 201-3 Discrete Mathematics II

*CMPT 126-3 may be taken in lieu of CMPT 120-3 and 125-3.

PHIL Requirements

Students are required to complete at least 16 credit hours of lower division credit including one of
PHIL 100-3 Knowledge and Reality
PHIL 120-3 Intro Moral Philosophy

and one of
PHIL 150-3 History of Philosophy I
PHIL 151-3 History of Philosophy II

6.

and all of
PHIL 201-3 Epistemology
PHIL 203-3 Metaphysics
PHIL 210-4 Deductive Logic

Upper Division Requirements (61 credits)

CMPT Requirements

CMPT 300-3 Operating Systems
CMPT 307-3 Data Structures and Algorithms
CMPT 310-3 Artificial Intelligence Survey
CMPT 354-3 Database Management Systems
CMPT 405-3 Design and Analysis of Computing Algorithms

and one of
CMPT 320-3 Implications of a Computerized Society
PHIL 320-3 Social and Political Philosophy
PHIL 321-3 Moral Issues and Theories

and one of
CMPT 383-3 Comparative Programming Languages
CMPT 384-3 Symbolic Computing

and one of
MACM 300-3 Introduction to Formal Languages and Automata with Application
PHIL 310-3 Modal Logic and its Applications

and one 400 level course from the AI concentration (see *Computing Science*)

and two additional 400-level CMPT courses

PHIL Requirements

A total of 28 upper division Philosophy credits are required, including
PHIL 341-3 Philosophy of Science
PHIL 344-3 Philosophy of Language I
PHIL 343-3 Philosophy of Mind

and one of PHIL 350-3 Ancient Philosophy, PHIL 352-3 17th century philosophy, PHIL 356-318th century philosophy, PHIL 322-3 History of Ethics, or a 3rd-year topics course in History or Value Theory (PHIL 331-3,332-3,333-3,357-3)

and one of
PHIL 444-4 Philosophy of Language II
PHIL 455-4 Contemporary Issues in Epistemology and Metaphysics

and one additional 4-credit 400 level course

and
PHIL 477-5 Honors Tutorial I

7.

Note: SFU regulations require at least 132 total credits for an Honors Degree. For a B.A. from the Faculty of Arts and Social Sciences, students must fulfill the Faculty of Arts and Social Sciences requirements, such as the Breadth Requirements. For a B.Sc. from the Faculty of Applied Science, students must fulfill the Faculty of Applied Science requirements, such as the Residency Requirements. The University's QBW requirements must be met as well for either Bachelor's Degree.

Students are encouraged to enrol in the Cooperative Education program.

3. Proposed Calendar Description – Arts and Social Sciences Entry

The following text is proposed to be placed in the *Department of Philosophy* section under *Faculty of Arts and Social Sciences*.

Joint Major and Honors Program in Computing Science and Philosophy

See "Joint Major and Honors Program in Computing Science and Philosophy" on page x.

Proposal:

Joint Major and Honors Program in Computing Science and Philosophy at Simon Fraser University

submitted to
Ministry of Advanced Education
Degree Program Review

Date: Feb 7, 2007

Contact:
Dr. Oliver Schulte
School of Computing Science/ Department of Philosophy
Simon Fraser University
oschulte@cs.sfu.ca
604-291-3390

Executive Summary

1. <u>Credential to be awarded</u>: Joint Degree in Computing Science and Philosophy (Major, Honors), with either a B.Sc. credential or a B.A. credential.

2. <u>Location</u>: SFU. Initial program offerings at only the Burnaby campus due to a current lack of diversity in course offerings at the Surrey campus.

3. <u>Faculty</u>: Arts and Social Sciences, Applied Science. The administrative home is Applied Science.

4. <u>Anticipated program start date</u>: September 2007

5. <u>Description of the proposed program</u>

The joint degree in Philosophy and Computing is an interdisciplinary degree focusing on philosophy and computing science. The program will offer students the opportunity to pursue each discipline in detail, but will contain a special emphasis on overlapping concerns.
Degrees of this kind have responded particularly well to equipping students with the skills to investigate theoretical issues arising in each discipline. The degree should also prepare student for careers, such as Information Technology.
The joint program is projected to have initially a rather modest enrolment, and well below the proposed cap of 30 FTE's.

The proposed program complements the university's mandate in several ways:

1. It is an excellent fit for the curriculum reform initiative at SFU, combining as it does a rigorous training in quantitative, technical and formal skills, much exposure to analytic and essay writing, and a great breadth of topics and methodologies from both the humanities and the information sciences.
2. The focus on interdisciplinary content is consistent with the university's vision statement.
3. The program complements the university's international strategic initiative in virtue of being attractive to international students.

The program will initially be taught at the Burnaby campus. It will make use of traditional classroom pedagogies, and existing courses in both Computing Science and Philosophy. No new resources are required.
The joint major comprises 94-98 credits with lower division requirements (50-54 credits) and upper division requirements (44 credits). The joint honors comprises 114-118 credits with lower division requirements (53-57 credits) and upper division requirements (61 credits).
This joint program is unique within British Columbia post-secondary institutions.

0. Background and Purpose

There is a natural intellectual affinity between Computing Science and Philosophy. The commonalities shared by these disciplines consist largely in the very substantial amount of logical inference and abstract conceptual organization required in both fields. The ability to reason clearly, and to formulate plans for creating complex, coherent, and logically correct systems will be mutually reinforced by training, which would be given in each of the two disciplines.

The joint degree in Computing Science and Philosophy is intended to be an option for most students pursuing majors degrees in Philosophy or Computing. We expect that it will be particularly attractive to:

1. Students throughout the Lower Mainland who want an interdisciplinary program in Arts and Sciences.

2. International students in the Lower Mainland who are attracted to computing science and who also desire exposure to the Western philosophical tradition and Western philosophical methods. (There are 106 international students in Computing Science for the Summer Term, 2006.)

3. Students intending to pursue graduate studies in areas of philosophy requiring a computing science background.

1. Degree Level Standard

As a University under the B.C. Universities Act, Simon Fraser University has had legal degree granting status since 1965, and has offered an increasing number of Baccalaureate Degrees since that time. The new program was designed to meet the existing degree standards at Simon Fraser, following these principles:

1. The joint major observes all the general major requirements in both the Faculty of Arts and Social Science and Faculty of Applied Science (e.g., breadth requirement in FASS). The same holds for the joint honors program.

2. The joint major combines about 2/3 of the number of credits from each regular major (CS major, Philosophy major). The same holds for the joint honors program.

3. We restricted some electives to require courses that are particularly pertinent to the intellectual aims of the program (e.g., Artificial Intelligence in Upper Division Computer Science).

2. Credential Recognition and Nomenclature

From the Arts side, blending a degree with training in Information Technology is seen as a large plus by employers and students. Studies consistently show that philosophy majors are among the top group of the humanities and social sciences as far as their employment rate and life-time earning potential is concerned (with many pursuing a career in the information technology industry). Moreover, in polls a clear majority of business leaders assert that the ideal preparation for the leaders of tomorrow is a combination of analytical and communication skills together with a solid technical background. This is the kind of leadership training that the proposed joint program will provide.

3. Curriculum/Program Content

a) Program Structure and Length of Program
The program requirements are entirely composed of courses that *already exist* and are taught in regular annual or bi-annual cycles at SFU. The articulation of required courses comprises 3 main areas relating to the learning objectives of the program.

1. The core courses at which Computing Science and Philosophy intersect.

2. The remaining core courses of Computing Science.

3. The remaining core courses of Philosophy.

Neither work experience, nor a work place term is required for degree completion.

The major can be completed in the usual number of semesters at SFU, i.e. eight semesters of full-time study @ 15 hours per semester (4 years). For the honors degree we anticipate a completion time of 5 years. Elective enrolment in the Co-Op Program will likely lengthen a student's completion time.

b) Governance of the Joint Programs

The program is overseen by the Undergraduate Chairs of Computing Science and Philosophy. The administrative home is within the Faculty of Applied Science for purposes of student registration, appeals and graduation processing.

c) Calendar Course Description.

See previous pages 1-8

4. Learning Methodologies/Program Delivery/Enrolment Plan

The courses that comprise the joint major and honors programs are delivered through well-established conventional mechanisms of university course delivery practiced at

SFU. The joint degree makes use of existing faculty and courses. The calendar course descriptions provide information about the vectoring of courses.

The program will be capped at 30 students per year. Projected demand in the immediate future is substantially lower. There were 10 Computing Science majors who completed an upper division Philosophy course during the 2005-6 academic year. There were 0 Philosophy students who completed an upper division Computing Science course during that interval. These numbers may increase as a result of the program's creation, and in light of the intellectual affinities between the disciplines.

5. Admission

The administrative home is within the Faculty of Applied Science for purposes of student registration, appeals and graduation processing. Interested students should contact advisors in both the Department of Philosophy and the School of Computing Science. Permission to enrol in the program must be obtained from both the Department of Philosophy and the School of Computing Science. The general principle is that students should meet the admission requirements of both departments.

6. Faculty

There are no faculty appointed specifically to this program. Existing faculty will teach currently existing courses. All courses in the joint degree are currently taught by members of their home departments. These are mounted as regular course offerings, and no special investment of teaching or research time is required from any faculty member.

7. Program Resources

University Facilities The joint degree makes use of existing faculty, courses, library holdings and computer facilities. No new resources are required.

Student Support and Academic Advising

Students can consult with the advisors either in Computing Science or in Philosophy. The advising staff has been consulted in the development of this program. Both departments have in place a number of support systems for their majors and honours students. Students in the new program will have access to these; current capacities are sufficient.

8. Program Consultation

Drs. Oliver Schulte and Bob Hadley developed the initial program proposal and calendar description/curriculum in consultation with the undergraduate advisors in Computing Science and Philosophy, and with then FAS Associate Dean Rob Cameron. The proposal with calendar description was reviewed in the undergraduate curriculum committees of both departments, and approved after revisions. The respective departments followed the

recommendation of the committees and approved the proposal, including the calendar description. The FASS and FAS curriculum committees also approved the proposals with calendar description, with some updates to reflect changes in the majors (e.g., change in the philosophy major). SCUS approved the Notice of Intent.

9. Program Review and Assessment

All academic units at SFU are subject to external review every six years. The program's administrative home is in Applied Science, and will be reviewed in Computing Science. Furthermore, the undergraduate committes in both Philosophy and Computing Science monitor the state of their programs. In addition to the major review process of external reviews, SFU has ongoing methods of reviewing the quality of academic courses and instruction. These include:
- instructor evaluations conducted near the end of each course;
- regular performance review in teaching of all faculty members by Departmental Tenure and Promotion Committees.

10. Implementation Schedule

As explained above, the necessary resources and mechanisms for administering the program are in place already. The program can start admitting students as soon as it is approved and the description appears in the calendar. We hope to complete the approval process in time for the first students to enrol in the **Fall Term 2007**.