S.01-20
As amended by Senate 5 Mar 01

SIMON FRASER UNIVERSITY

Senate Committee on University Priorities

Memorandum

TO: Senate

FROM: Judith Osborne
Acting Vice President, Academic

RE: Centre for Scientific Computing

DATE: 13 February 2001

Attached is a proposal from Dr. Willie Davidson, Dean of Science for the establishment of a Centre for Scientific Computing as a Schedule A Centre.

The Senate Committee on University Priorities reviewed the proposal at its February 7, 2001 meeting. The proposal was unanimously approved subject to a consideration of library resources.

As indicated in the attached correspondence from Todd Mundle, Head, Collections Management Office of the W.A.C. Bennett Library, the Library is satisfied that it can support this Centre.

Once approved by Senate, the proposal is to be submitted to the Board of Governors.

Motion

That Senate approves and recommends to the Board of Governors the establishment of the Centre for Scientific Computing outlined in document S.01-20

Attachments.

c. W. S. Davidson
R. Russell
J. Waterhouse
R. Marteniuk
E. Love
B. Clayman

W.A.C. Bennett Library
Simon Fraser University
Memorandum

To: Bruce Clayman, VP Research

Subject: Library Report for proposed Centre for Scientific Computing

Cc: Lynn Copeland, University Librarian
Robert Russell, Mathematics and Statistics
Sue Roppel, Secretary, SCUP
Marjorie Nelles, Liaison Librarian for Computing Science and Math/Statistics

From: Todd M. Mundle
Head, Collections Management
tmundle@sfu.ca

Date: February 15, 2001

Here is the Library Report regarding the proposed Centre for Scientific Computing.

I've read over the proposal the Centre for Scientific Computing and I am satisfied that the Library can support this Centre. There are no outstanding issues at this point but as with all Centres there may be future hiring of faculty with specific interests outside the current scope of the proposed Centre for Scientific Computing.

When hiring such individuals it would do well to compare the compatibility of their research interests with existing Library resources. If a mismatch is determined and new resources are required, payment for new books, journals or databases would have to come out of the existing library materials budgets assigned to associated departments (Mathematics, Statistics, Physics, Chemistry and Computing Sciences). Alternatively a novel budgeting process could be struck between the Faculty of Science and the Library.

This is a general concern regarding new hires and not specific to the Centre for Scientific Computing.

Costs:

THERE ARE NO ADDITIONAL LIBRARY COSTS ASSOCIATED WITH STARTING THIS CENTRE

If you have any questions regarding this report, please don't hesitate to contact me by phone (3263) or by email, tmundle@sfu.ca.

SIMON FRASER UNIVERSITY

MEMORANDUM
OFFICE OF VICE-PRESIDENT, RESEARCH

TO: Sue Roppel, Secretary
Senate Committee on University Planning (SCUP)

FROM: Bruce P. Clayman
Vice-President, Research

RE: Centre for Scientific Computing

DATE: January 12, 2000

Attached is a proposal from Dr. Willie Davidson, Dean of Science, for the establishment of a Centre for Scientific Computing as a Schedule A/B Centre.

The Governing Committee for Centres and Institutes recommends that the Centre be granted approval by SCUP. Once approved by SCUP, the proposal is to be forwarded to Senate, followed by submission to the Board of Governors.

Governing Committee:

Dr. John H. Waterhouse
Vice-President, Academic and Provost

Bruce Clayman

Dr. Bruce P. Clayman
Vice-President, Research

Attachment

C: W. S. Davidson
R. Russell
J. Osborne
R. Marteniuk
E. Love

SIMON FRASER UNIVERSITY
MEMORANDUM

To: B.P. Clayman,
Vice-President, Research

From: W.S. Davidson, Dean
Faculty of Science

Subject: Centre for Scientific Computing

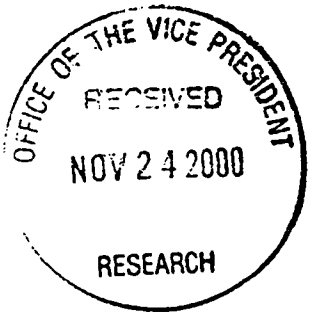
Date: November 20, 2000

I am pleased to support establishing the Centre for Scientific Computing as a Schedule A University Centre under the authority of the ~~Dean of Science.~~ Vice Pres. Research

The Centre for Scientific Computing will pull together faculty from several departments and faculties across the University. It builds on existing strengths and it is timely, having support from the directors of MITACS and PIMS. The membership of the Centre, its governance, and initial financial support are well documented. There are no long-term budget implications for the University.

William S Davidson.
W.S. Davidson

c: J. Waterhouse
J. Osborne
R. Marteniuk
E. Love



rdr@cs.sfu.ca, 1/11/01 10:30 AM -0800, re: Re: January 10, 2001

Date: Thu, 11 Jan 2001 10:30:41 -0800 (PST)
From: rdr@cs.sfu.ca
To: bralph@sfu.ca
Subject: re: Re: January 10, 2001

Dear Willie,
Two night's ago at the January Senate meeting I raised my concern with Bruce Clayman that our Centre for Scientific Computing proposal be on the February Senate meeting agenda for approval as a Schedule A Centre. At that time, as he explains in his email below, he mentioned that some clarification was required vis a vis the need for our Centre given that MITACS and PIMS already exist.
This clarification is fairly straightforward: First, the applied and computational mathematics group in the Department of Mathematics and Statistics has been developing its Centre proposal for some time, and it was only after the proposal was in its final form that the possibility that a relationship with PIMS could facilitate substantial funding for our Centre arose. But regardless, our Centre will be involved in precisely the same types of activities as the other SFU Schedule A Centres. It has obtained very broad support from researchers in scientific computing across campus, stimulating cross disciplinary research in this focussed area. In addition, the Centre will be involved in the graduate training of applied/computational mathematics students, playing basically the same role as the Institutes for applied mathematics at the Universities of British Columbia and Alberta. We need "official status" in order to adequately promote our activities and recruit our graduate students.
The role of MITACS, to fund industrial interactions with select groups of researchers (primarily in Mathematics and Computing Science), is much more specialized and only peripherally related to our proposed Centre. On the other hand, PIMS is a cross university effort to fund the mathematical sciences in a very broad sense (as, of course, you know). The members of our Centre are dedicated SFU researchers whose activities are relatively independent of whether PIMS exists or not. It seems only reasonable that the Centre benefit from the facilities available to PIMS (primarily in ways which at this point we can only speculate on), as do other related Centres such as the CECM benefit from the existence of PIMS, and we would hope that the SFU Administration is supportive of our finding creative ways of obtaining financial support.
It has never been in our minds that the Centre's existence would be based upon that of PIMS. We are an independent, focussed, important research unit at SFU, quite distinct from the broad PIMS structure, and we are most eager to obtain our "official" SFU Schedule A Centre status and move forward in serving the SFU research community.
Please let me know asap if any further clarification is necessary.
Thanks very much, Bob

Author of message: Robert Russell
Dept of Mathematics & Statistics

Application for Creation of an SFU Schedule A Centre:

Centre for Scientific Computing

1. Scientific Computing & Modern Science

It is no overstatement that scientific computing, as a primary subdiscipline of applied mathematics, has experienced changes of revolutionary proportion over the past decade. The explosive growth in capacity of large-scale computing and high-speed data networking has made real the *virtual laboratory*. More than just a simulation and visualization tool, the computer has now itself become an indispensible environment for scientific research. This new role for the computer demands interdisciplinary research teams combining strong mathematical and computational expertise with in-depth specialized technical knowledge.

The importance of basic applied mathematics has grown largely because for many of the industrial and technological applications of computing, the central challenges are mathematical ones. In the words of Tom Brzustowski, NSERC President, at the first MITACS Annual General Meeting this year,

> "Mathematics is the language of high technology. Indeed it is, but I think it is also becoming the eyes of science."

With the field of Scientific Computation evolving at the *speed of technology*, maintaining a leading position within this research community requires vitality and adaptability.

Over the past seven years, the Applied Mathematics group in the Department of Mathematics and Statistics has undergone extensive revitalization. The department has been fortunate in attracting some exceptionally talented young applied mathematicians, enhancing its considerable strength in scientific computing while adding new strengths in mathematical modeling and nonlinear analysis. With the addition of new members, the group possesses renewed energy and has established collaborations within the university, as well as with other universities, industry and research laboratories.

It is noteworthy to point out related changes in other SFU departments. New faculty with expertise in mathematical modeling and scientific computing have been and are being hired in Chemistry, Molecular Biology and Biochemistry, Biology, Computing Science, Earth Sciences, Kinesiology, and Engineering. These are generally new priorities for many of the departments which have been motivated by the expanding role played by scientific computation and mathematical modeling within the disciplines. In addition, a traditionally high level of support for mathematical research

exist within the theoretical group in Physics. A major mission of the Centre for Scientific Computing is to provide an organized focus for these shared connections between the Applied Mathematics group and the broader SFU computing community.

2. Scientific Computing & Mathematical Sciences at SFU

This proposal of a new Centre coincides with a time of significant opportunity for the mathematical sciences at SFU. Key support, in the form of resources and administration, is forthcoming from the Pacific Institute of Mathematical Sciences (PIMS) and the Mathematics of Information Technology and Complex Systems (MITACS) National Centre of Excellence. The directors of these programs, Nassif Ghoussab (PIMS) and Arvind Gupta (MITACS), have made clear the willingness of these organizations to act as catalysts for the new Centre's growth. Indeed, the new Centre at SFU fits in well with PIMS's long-range plan for the endowment of university-based mathematical research centres, and PIMS has committed short-term institutional infrastructure (temporary space, staff support, visibility, etc.). The recent relocation of the national MITACS headquarters to Burnaby substantially strengthens the University's commitment to Applied Mathematics at SFU. Both PIMS and MITACS, located in the East Annex Laboratory Building, are eager to provide the physical focal point for computing labs, postdoctoral offices and research workshops. Ballard Power Systems, SFU's major technology partner in the MITACS initiative, has expressed an interest in broadening its base of contact with SFU researchers.

Finally, the recent award from the Canada Foundation for Innovation (CFI) for a high-performance computing environment involved a joint proposal between the Centre for Experimental and Constructive Mathematics (CECM) and faculty members from four departments (Mathematics & Statistics, Computing Science, Physics, and Chemistry). This brings to the campus significant new capacity in parallel computation, making SFU ideally poised to take on the leadership role in Canadian scientific computing research.

3. A Central Focus for Scientific Computing

The major purpose of the Centre is to provide SFU with a visible focus for computational research, on the campus and in the wider Pacific Rim research community. Specifically, the Centre's goals are to facilitate discussion between scientific computing research groups (through seminars, workshops, and conferences), to provide advanced instruction in computational techniques and applications (through graduate and postdoctoral programs), and to actively pursue joint research ventures with industry, government, and laboratories.

Although the current impetus for the formation of this Centre is being driven

by the members of the Applied Mathematics group, the vision for the Centre is to create a fertile mix of scientific and industrial discourse cutting across traditional disciplinary boundaries.

4. Blueprint for a Centre

Specific activities with the required resources to make them viable are listed below.

Research Environment

a MITACS Projects: A team led by Promislow in the Applied Mathematics group at SFU has been instrumental in the development of the highly successful MITACS research collaboration with Ballard Power Systems, the world leader in proton exchange fuel cell technology. The working group for this MITACS project, also involving researchers at UBC and University of Calgary, supports two postdoctoral fellows and numerous graduate students through funding from MITACS and Ballard Power Systems. The initiatives also include members from departments of Physics, Chemistry, and Computing Science.

b Computing Laboratory: Three members of Applied Mathematics group (Muraki, Russell, Ruuth) are Co-Principal Investigators in the recently successful CFI grant for High Performance Computing. The resources available will bring state-of-the-art parallel computing machines to the SFU campus. While severe space limitations in the Mathematics Department will not permit sufficient lab space to fully utilize this computing capability, it is hoped that PIMS/MITACS support will generate the needed space that can accommodate both the Centre for Scientific Computing and the CECM.

c Seminars: The Applied and Computational Mathematics seminar series has been moved to the PIMS conference facility. A series of joint colloquia between Applied Mathematics and the Departments of Physics and Computing Science has been initiated. It is hoped that further interdisciplinary forums will be similarly hosted by PIMS. Additional funding from PIMS will also allow more speakers to be invited from outside of the Pacific Northwest region.

d Research Conferences: PIMS is open to hosting several research conferences and workshops with themes in scientific computing. This year's Numerical Analysis Potlatch and Fast Multipole Workshop, organized by the Applied Mathematics group (Trummer/Ruuth and Kropinski) are hosted and supported financially by PIMS and SFU.

e Visitor Program: The PIMS/MITACS facility offers office and staff support for long term visitors (such as sabbatical visitors). Such an arrangement can help establish the East Annex facility as a meeting place for scientific computing.

f Industrial Problem Solving Workshops: PIMS's most successful industrial interaction to date has been these week-long workshops, held annually since 1997, which draw local industries together with Canadian and international faculty members. The Centre will continue a strong level of commitment to these highly successful workshops, as well as to the affiliated graduate student workshops (see below).

g PIMS industrial projects: PIMS has expressed the desire to expand its collaborative activities with industry, and the Centre would be well-positioned to play a leading role in this.

Education & Professional Development

a Postdoctoral Fellows: Currently, between the Applied Mathematics group and the CECM, there are a large number of PDFs involved in computational mathematics. They are supported through a combination of industrial, NSERC, PIMS, and MITACS funds, as well as some being jointly supervised with faculty at UBC. These PDFs play an essential role in the PIMS/MITACS facility, focussing the research activities and contributing to the intellectual energy of the Centre.

b Graduate Program Recruitment: A major benefit derived from the Centre will be the increased visibility and identity gained for SFU's computationally-oriented graduate programs. The organization of lab facilities and research groups around the Centre will certainly project the full vitality of computing activity at SFU.

c Graduate Industrial Mathematical Modeling Camps: This high visibility national program has been run successfully for two of the last three years by the Applied Mathematics group, in conjunction with PIMS. This event places a spotlight on the computational strengths at SFU for potential graduate students, as well as providing an opportunity for SFU's industrial partners to communicate their computing needs.

d The eventual aim of the Centre is to host joint graduate courses between departments. The connections fostered through external memberships will help facilitate interdisciplinary graduate coursework.

e MSc in Scientific Computing: The feasibility of providing an MSc option in Scientific Computing is being investigated with the Schools of Computing Science and Engineering, with whom the Applied Mathematics group has close ties.

Professional Outreach

a CAIMS Newsletter - The Canadian Applied and Industrial Mathematics Society (CAIMS), the major applied mathematics organization in Canada, publishes its newsletter at SFU under the leadership of G. Graham, a member of the Applied Mathematics group and the Secretary of CAIMS.

b Thematic Programs: The Centre will provide a mechanism, through the auspices of PIMS/MITACS, for the organization of thematic programs. An annual research theme can be coordinated with the PIMS Distinguished Speaker Program.

5. Centre Governance

Schedule The Centre for Scientific Computing shall be a Schedule B University Centre under the authority of the ~~Dean of the Faculty of Science~~. Vice-Pres. Research.

Administrative Officer The Dean of the Faculty of Science shall be the Administrative Officer for the Centre for Scientific Computing .

Director The Centre for Scientific Computing shall have a Director who shall be elected for renewable three-year terms. An Associate Director may be appointed by the Director in consultation with the membership.

Day-to-day administration of the Centre for Scientific Computing shall be the responsibility of the Director. The Director shall exercise the rights of the Centre under the terms of Section 5.1 of AC 40.01 and shall meet the obligations set out in 5.2 of AC 40.01.

Membership The Director of the Centre shall be a regular employee of the University. Regular membership in the Centre for Scientific Computing shall be available only to Simon Fraser University faculty. Regular membership in the Centre will be obtained through a majority vote of the Board of Advisors following application to the Director. Associate memberships, which entitle individuals to all the benefits of regular membership save a vote in Centre proceedings, shall be available. Associate members must be approved in the same fashion as regular members. Additional categories of membership may be established by the Director in consultation with the membership and with the approval of the Administrative Officer.

The initial membership of the Centre for Scientific Computing will include the following individuals, who have agreed to participate:

- The Board of Advisors - Initially, the Board shall consist of R. Russell (the first Director), M. C. Kropinski, S. Ruuth, and two members of the Centre from other departments.
- Other regular members from the Mathematics Department - J. Borwein, P. Borwein, R. Choksi, L. Goddyn, C. Graham, A. Lewis, D. Muraki, M. Monagan, E. Pechlaner, K. Promislow, C. Shen, and M. Trummer.
- Members of other SFU departments who have agreed to be members include Bhattacharya, Gupta, Hafer, Krishnamurti, and Moeller from Computing Science; Ballentine, Bechhoefer, Hayden, Kirczenow, and Plischke from Physics; Lockhart, Sitter, and Swartz from Statistics; Cavers, Gupta, Jones, Saif, and Trajkovic from Engineering Science; Baille and Pio from Molecular Biology and Biochemistry; Roitberg and Delaney from Biology; Wilkie from Chemistry; Finegood from Kinesiology; Allen, Calvert and Stead from Earth Sciences; and Choo, Love, and Warburton from Business.
- Various associate members from other PIMS universities, including University of British Columbia, University of Victoria, and University of Washington.
- Various associate members from industry and government.

6. Budget

An initial start-up reserve of $5,000 per year to cover general expenses has been allocated from the Dean of Science office for the first two years of operation. As well, modest nonfinancial support will be sought from the Department of Mathematics.

Commitments of initial support in kind have been received from the Directors of both MITACS and PIMS. They consist of the following:

- secretarial support for promoting The Centre's activities such as workshops and conferences, graduate recruitment, seminar coordination, visitor coordination, and webpage maintenance.
- initial financial support ($1,000 per semester) for seminar expenses.
- limited office space in the East Academic Annex.

Obligation to Act in Accordance with University Policy

The Centre for Scientific Computing acknowledges its obligation to conduct its activities in accordance with University policies.