

SIMON FRASER UNIVERSITY
Senate Committee on University Priorities
Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: BC Synchrotron Institute (BCSI)

DATE: June 17, 2002

Attached is the proposal for the establishment of the BC Synchrotron Institute (BCSI) submitted for consideration by Dr. Colin Jones. This will be a Schedule B Institute reporting to the Vice President, Research in accordance with Policy R 40.01.

The Senate Committee on University Priorities reviewed the proposal at its June 12, 2002 meeting. The proposal was unanimously approved. Once approved by Senate, the proposal will be submitted to the Board of Governors.

Motion:

That Senate approve and recommend to the Board of Governors the establishment of the BC Synchrotron Institute (BCSI) as outlined in document S02-52

encl.

- c. B. Clayman, VP Research
- C. Jones, Faculty of Science

SIMON FRASER UNIV.

MEMORANDUM
OFFICE OF VICE-PRESIDENT, RESEARCH

TO: Laurie Summers, Secretary
Senate Committee on University
Planning (SCUP)

FROM: Bruce P. Clayman
Vice-President, Research

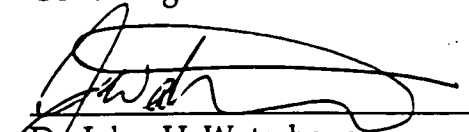
RE: B.C. Synchrotron Institute (BCSI)

DATE: April 12, 2002

Attached is a proposal from Dr. Colin Jones for the establishment of the B.C. Synchrotron Institute (BCSI) as a Schedule B Institute (centres or institutes that have a University-wide mandate) under the direct authority of the Vice-President, Research.

The Governing Committee for Centres and Institutes recommends that the Institute 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



Dr. Bruce P. Clayman
Vice-President, Research

Attachment

c: C. Jones

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The BC Synchrotron Institute

January 24th, 2002

Introduction

The Canadian Light Source (CLS) is presently under construction at the University of Saskatchewan in Saskatoon and will be commissioned in 2003 and opened for use in 2004. The CLS, constructed at a cost of \$173 million, will be operated as a National Laboratory and will be Canada's only source of synchrotron radiation. Funding for the construction of CLS has come from a range of agencies, including CFI, the Provinces of Saskatchewan, Alberta and Ontario, Western Economic Diversification, the University of Saskatchewan and the private sector in Saskatchewan.

The CLS is built around an electron accelerator in which electrons, accelerated to 2.9 GeV and moving at 99.999 percent of the speed of light, are bent through magnetic fields and are thereby induced to emit synchrotron radiation. This electromagnetic radiation is of remarkably high intensity, spanning the electromagnetic spectrum from the infra-red through to hard x-rays. The intensity of these beams of radiation, coupled with the range of wavelengths accessible and the coherence of the beams, make synchrotron radiation sources exceptionally versatile, if not unique, tools.

The applications of synchrotron radiation as a research and analytical tool and as a development tool in industry can be illustrated with reference to a number of examples:

- It is possible, employing the high intensity of synchrotron x-rays, to rapidly determine the molecular structures of proteins and other biological macromolecules, even on very small crystals. This ready access to molecular structures will be vital in the field of proteomics, which is on the brink of a revolution which will further transform our understanding of life-processes. In addition to fundamental research, these techniques will have dramatic implications for the pharmaceutical industry and the rational design of new drugs.
- Synchrotron radiation makes available a wide range of sophisticated techniques for the study of advanced materials. New techniques based on resonant soft x ray scattering will make it possible to investigate the structure and electronic properties of ultra thin films of both organic and inorganic materials. Such materials find application in nanostructured devices, in spin electronics, and photonics. Other advanced materials under investigation will span the range from semiconductors and superconductors to polymer membranes for the hydrogen fuel-cell. These investigations will not only add to our knowledge of their fundamental structure, but will help guide the discovery and synthesis of new materials, which will, in turn, become the foundation of new technologies of the future.
- The measurement of trace elements in environmental and biological samples, together with the identification of their chemical form, represents another forefront application of synchrotron radiation. These techniques will find many unique applications in the field of Environmental Science, with importance in the mining, forestry and agricultural industries.

Other fields where major advances can be expected include Earth Sciences, Geology, Engineering, Lithography, the fabrication of Microelectromechanical Systems (MEMS), and Medical Imaging.

There are a number of research groups within the B.C. universities which have been actively engaged in forefront synchrotron research at international facilities for some years and are leaders in the field in Canada. There are currently research programs at the National Synchrotron Light Source at Brookhaven, the Advanced Photon Source at Argonne, the Advanced Light Source at Berkeley, the Synchrotron Radiation Centre in Wisconsin, the European Synchrotron Radiation Facility in France.

Spring 8 in Japan and DESY in Germany. These continuing programs provide an exceptionally strong base within B.C. for such research, a base which will be of considerable value to the CLS when it opens in 2004.

The Importance of Synchrotron Radiation Studies for British Columbia

The universities, the high technology companies and other components of the BC industrial sector all stand to benefit from access to, and an active participation in, the CLS and other synchrotron facilities. Currently some 40 or so individual researchers at UBC, UVictoria, SFU and UNBC have been identified as having keen interests in performing some aspects of their research at the CLS. This number will undoubtedly grow over the next several months. The potential for application in the BC private sector is also considerable and we anticipate many companies in the high technology, environmental, engineering and resource-based industries to become active users of the CLS. The federal and provincial science-based laboratories in B.C., including those in the hospitals, represent another important group of potential users.

The benefits of CLS to the B.C. universities can be seen as:

- Access to forefront, innovative techniques, competitive with those available in other leading industrial nations, which will enrich research in materials sciences; in molecular biology, pharmacy and medicine; in environmental science; and in engineering, mining, forestry and agriculture.
- Access to the CLS will help attract top international talent to faculty positions in the B.C. universities in selected areas of science, engineering and medicine.
- Graduate training in Canada at a world-class, international facility, exposing graduate students to the latest developments in fast developing fields of research and providing the opportunity for collaborations with researchers from other countries.
- A scientific venue that will bring together university and industry researchers who share an interest in common scientific problems. The relationship between the field of structural biology and the pharmaceutical/biotechnology companies is an excellent example.
- The CLS will provide contingent laboratory space to researchers, thereby enhancing the space available to B.C. at no cost to the universities.

In order for BC to benefit to the fullest extent from CLS, we must be prepared to inform and advise our researchers across the Province of the opportunities that the CLS will present and to assist in coordinating their proposed participation at the CLS. It will also be critically important for B.C. to provide financial support towards the CLS beamlines. Ontario and Alberta have each committed \$9 million of provincial funding to CLS and Quebec and Manitoba are now poised to make similar contributions.

The British Columbia Synchrotron Institute

i) This Institute will have members drawn from:

- UBC, UVictoria, SFU and UNBC.
- B.C. Companies
- The Federal and Provincial Government Laboratories in B.C.

ii) The Institute will have as its mandate:

- To inform the academic, industrial and government laboratory communities of the range of opportunities that exist through synchrotron radiation studies. This will be done through workshops, symposia and conferences, as well as through demonstration projects arranged at existing synchrotron facilities.
- To act in a coordinating role in assisting researchers, drawn from many different disciplines and areas of specialization across the B.C. universities, from government laboratories and from industry, in their use of synchrotron radiation.
- To represent B.C. in discussions with the CLS, as a national laboratory, relating to access to facilities; to participate in the activities of the Canadian Institute for Synchrotron Radiation; and to raise B.C.'s profile nationally in this area of research and development.
- To assist in preparing B.C. applications for funding for facilities and equipment from agencies such as CFI. In particular, an application to CFI in Fall 2002 for funding for two beamlines in areas of direct interest to B.C. researchers is proposed. CFI applications will be submitted through one of the member universities.
- To conduct a study of the potential economic impact on BC of our participation at the CLS.

iii) Funding for the Institute will be obtained initially from the universities, from the Provincial Government and from Western Economic Diversification. The Institute will explore avenues for continuing funding from a variety of sources.

iv) In terms of governance, the Institute will have:

- A Board with ten members drawn from the B.C. universities (5), the business community (3), the BC Provincial Government (1) and the Federal Government (1).
- A Scientific Advisory Committee with members drawn from the universities, business and the government laboratories. The SAC will assist in the development of the CFI applications and other applications for funding of scientific projects.
- A Program Coordinating Committee to assist in the organization of workshops, symposia and conferences.

v) The BCSI will be established as an Institute at each of the participating universities and will be formally bound together as a common Institute through a MOU approved by each Institution. UBC will act as the administrative center for the Institute and will assist in the administration of funds to operate the Institute and grant funds awarded to BCSI. The Faculty of Science at UBC will be the host Faculty.

vi) Each of the universities will have a Site Director, selected by and from the members at that university, to assist in the coordination of the activities of the Institute at the different universities. The Institute will be a Schedule B Institute and will conduct itself in accordance with the Policies of the universities.

Founding members of the BCSI at Simon Fraser University, all of whom who have
agreed to be members, and their research interests relevant to the CLS.

March 11, 2002

1. **Barbara Frisken, Physics**
Membranes - small Angle X-Ray Scattering (SAXS)
2. **Steve Holdcroft, Chemistry**
Fuel Cell Materials - SAXS.
3. **Jennifer Thewalt, Physics/Molecular Biology and Biochemistry**
Skin Structure – SAXS, X-Ray Diffraction
4. **Frederic Pio, Molecular Biology and Biochemistry**
Protein Crystallography – X-Ray Diffraction, EXAFS
5. **Robert F. Frindt, Physics**
Layered Materials – X-Ray Diffraction, EXAFS
6. **Ross Hill, Chemistry**
Thin Film Characterization - X-Ray Diffraction
7. **Karen L. Kavanagh, Physics and Engineering Sciences**
Semiconductor Interfaces – X-Ray Diffraction, EXAFS, X-Ray Reflectivity
8. **Leah Bendell-Young, Biological Sciences**
Environmental Toxins - X-Ray Absorption Fine Structure Spectroscopy (XAFS)
9. **Margo Moore, Biological Sciences**
Environmental Toxins - XAFS
10. **Steven Dodge, Physics**
IR scattering
11. **Bret Heinrich, Physics**
Magnetic materials
12. **Simon Watkins, Physics**
Semiconductor Alloys – XAFS, X-Ray Standing Wave
13. **Gary Leach, Chemistry**
Thin films and interfaces – IR, X-ray Spectromicroscopy, ultrafast X-ray scattering
14. **Daryl Crozier, Physics**
Structure and Electronic Properties of Materials EXAFS
15. **Zuo Ye, Chemistry**
Inorganic Materials Piezoelectric, ferroelectric materials

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16. **Daniel Leznoff, Chemistry**
Molecular Magnetic Materials, Paramagnetic Organometallic Complexes
17. **Erika Plettner, Chemistry**
BioOrganic Chemistry - P450, Pheromone Biochemistry
18. **Mark Paetzel, Molecular Biology and Biochemistry**
Crystallographic analysis of protein targeting and translocation

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

To: Barb Ralph, Administrative Assistant
Office of the Vice President, Research

From: Todd M. Mundle
Associate University Librarian
tmundle@sfu.ca

Subject: Library Report for the proposed
SFU BC Synchrotron Institute (BCSI)

Date: April 11, 2002

Cc:
Lynn Copeland, University Librarian
Gwen Bird, Head, Collections Management
Marjorie Nelles, Liaison Librarian for Physics

Here is the Library Report regarding the proposed BC Synchrotron Institute (BCSI) located at SFU.

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

When hiring such individuals it is important to compare the compatibility of their research interests with existing Library resources. If a mismatch is determined and new resources are required the BCSI will have to provide funding to purchase such library resources. This is a general concern regarding new hires and not specific to the BCSI.

Costs:

THERE ARE NO ADDITIONAL LIBRARY COSTS ASSOCIATED WITH STARTING THIS INSTITUTE.

If you have any questions regarding this report, please don't hesitate to contact me by phone (3266) or by email, tmundle@sfu.ca.