

SIMON FRASER UNIVERSITY

OFFICE OF THE VICE-PRESIDENT, ACADEMIC

MEMORANDUM

To: Senate

From: D. Gagan, Chair *David Gagan*
Senate Committee on Academic Planning

Subject: Proposed Pacific Institute for the Mathematical Sciences (PIMS)
(SCAP Reference: SCAP 99 - 13)

Date: March 15, 1999

Action undertaken by the Governing Committee for Centres and Institutes and the Senate Committee on Academic Planning gives rise to the following motion:

Motion:

"that Senate approve and recommend approval to the Board of Governors, as set forth in S.99-32, the establishment of the Pacific Institute for the Mathematical Sciences (PIMS) as a schedule B institute under Policy R 40.01"

SIMON FRASER UNIVERSITY

MEMORANDUM
OFFICE OF VICE-PRESIDENT, RESEARCH

TO: Alison Watt
Secretary, Senate Committee
on Academic Planning (SCAP)

FROM: Bruce P. Clayman
Vice-President, Research

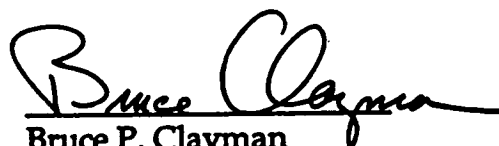
RE: Pacific Institute for the
Mathematical Sciences (PIMS)

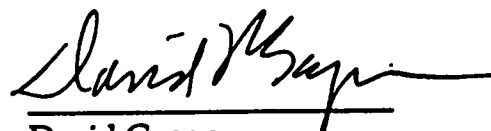
DATE: February 9, 1999

Attached is a proposal from Dr. Arvind Gupta for the establishment of a Pacific Institute for the Mathematical Sciences (PIMS) as a Schedule B Institute (institutes that have a university-wide mandate).

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

Governing Committee:


Bruce P. Clayman
Vice-President, Research


David Gagan
Vice-President, Academic

Attachments

99 FEB 12 09 53

January 27, 1999

Dr. Bruce Clayman
Vice-President Research
Simon Fraser University
Burnaby, BC
V5A 1S6



the Mathematical Sciences

oil pims@pims.math.ca/
o://www.pims.math.ca/

Dear Bruce,

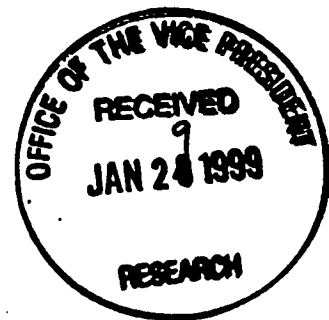
I am enclosing an updated *Proposal for the Recognition of the SFU site of PIMS*. The only change is in section **Implications for SFU** where I have clarified that SFU's obligations are those agreed to in forming PIMS.

My hope is that the proposal is now ready to proceed to Senate. We are expecting to start MITACS projects in mid to late February so once PIMS is formally recognized as a university institute it can take over the job of helping to administer these and other funds for the SFU scientists involved. PIMS also continues to run workshops, support PDF's etc at SFU and being recognized as an institute will allow us to provide direct administrative support.

If you have any other questions about this matter please do not hesitate to contact me.

Yours sincerely,

Arvind Gupta
PIMS-SFU Site Director



encl: Proposal, Appendix

Proposal for Recognition of the SFU site of the Pacific Institute for the Mathematical Sciences



Preface

This is a proposal toward recognition, by the SFU Senate and Board of Governors, of the SFU Site of the Pacific Institute for the Mathematical Sciences (PIMS). The Pacific Institute, being a multi-university organization, has offices at each sponsoring institution. Its central office is currently at UBC. PIMS involves scientists in several Faculties at SFU including Science, Applied Science and Education. It is proposed that the SFU site of PIMS be established as a Schedule B institute within Simon Fraser University reporting to the VP-Research.

What is PIMS?

The Pacific Institute for the Mathematical Sciences is a collaborative effort established in 1996 by scientists by the five BC and Alberta institutions – the University of Alberta, the University of Calgary, Simon Fraser University, University of Victoria and the University of British Columbia. PIMS currently has two affiliates, the University of Northern British Columbia and Lethbridge University. Its mandate is to promote research in the mathematical sciences, education and public awareness regarding mathematics, and collaboration between the academic, industrial and government sectors involving the mathematical sciences.

The PIMS community includes specialists in mathematics, statistics, computer science, mathematical physics, biology, chemistry, economics, operations research, management, engineering, and other fields involving mathematical methods. In addition, PIMS involves teachers in the mathematical sciences at all levels.

In the Canadian context, PIMS is the youngest of three national institutes specializing in mathematics; the others being the Fields Institute in Toronto and the Centre de Recherches Mathématiques in Montreal.

Since its founding, PIMS has received funding from the founding and affiliated universities, the governments of British Columbia and Alberta and from the Canadian Natural Sciences and Engineering Research Council, as well as industrial sponsors. In partnership with the other two Canadian mathematical institutes, PIMS has proposed a Network of Centres of Excellence entitled MITACS – Mathematics of Information Technology and Complex Systems. The letter of intent has been accepted, a full application was submitted, and the decision on MITACS is now pending.

Funding for PIMS

PIMS receives its funding from four main sources:

1. The Natural Sciences and Engineering Research Council of Canada;
2. The Province of British Columbia through the Information, Science and Technology Agency;
3. The Province of Alberta through the Alberta Science Research Authority;
4. The five PIMS founding universities.

In 98/99 PIMS' budget was approximately \$600,000. In 99/00 this is expected to increase to more than \$1,000,000. These funds are used to promote PIMS activities and provide administrative support for PIMS' offices at each university. Currently at SFU, PIMS provides a one course teaching release for the site director and administrative support (in 99/00 this is expected to consist of a full-time secretary). PIMS also funds an industrial facilitator and an education coordinator who work jointly between SFU and UBC to promote these aspects of PIMS mandate. One scientific coordinator is funded by PIMS to organize scientific events at all five sites.

Currently PIMS activities at SFU make use of space provided by the School of Computing Science as well as various labs of researchers involved with particular events. The Associate Vice President Academic has recently made substantial space available to PIMS in the East Academic Annex beginning May, 1999. It is expected that all PIMS activities will move to this new facility.

Activities of the Pacific Institute

Scientific Events:

PIMS has organized and sponsored dozens of scientific conferences and workshops, some in collaboration with other institutes. Most recently it has funded large-scale events such as *Probability Theory* and *Mathematical Economics and Finance*. Major events being planned for the next four years include programs in *Mathematical Biology*, *Graph Theory and Combinatorics*, *Constructive and Experimental Mathematics*, *Algebra and Lie Theory*, *Nonlinear Dynamics*, *Mathematical Methods in the Resource Sector*, and *The Theory of Knots*.

Pacific Rim Emphasis:

A special mission of PIMS is collaboration with other institutes in the Pacific Rim. PIMS has co-sponsored events with organizations in China, Korea, Japan and the United States. Recent examples are the Pacific Rim Geometry conference (UBC), Fifth International Workshop on Mathematical Aspects of Fluid and Plasma Dynamics (Maui), and the First Pacific Rim Conference on Mathematics (Hong Kong). Closer ties with other countries bordering the Pacific are being actively pursued.

Industrial outreach:

One of the most successful and unique of PIMS events is an annual Industrial Problem Solving Workshop in which selected industrial problems of a mathematical nature are presented to a group of mathematical scientists and students, who spend an intensive week working collectively and in groups to find solutions to the problems. The first such workshop was at UBC, summer 1997, and the second was held in Calgary in 1998, preceded by a week-long Industrial Mathematical Modelling Workshop at SFU designed for graduate students.

In addition PIMS has an Industrial Seminar which meets regularly throughout the year, with a similar objective of connecting mathematical scientists with industrial and government partners. Partners have included Ballard, Macmillan-Bloedel, Petro-Canada, BC Cancer Agency, Powertech and many other organizations from the industrial, financial and government sectors.

Young scientists:

PIMS currently sponsors over two dozen postdoctoral fellows at its member institutions. It holds an annual competition in which new PhD recipients are nominated by scientists from the PIMS

institutions. Successful candidates are awarded approximately 1/3 salary by PIMS, the remainder provided by other grants, teaching, etc. arranged by the sponsor.

Many PIMS conferences and events have introductory sessions intended for graduate students and non-specialists. Certain events, such as the Industrial Modelling Workshop are intended exclusively for graduate students. PIMS was a cosponsor of the Canadian Undergraduate Mathematics Conference (UBC in 1998). Other activities intended specifically for undergraduates was the recent PIMS Graduate weekend, in which about forty of the most talented third and fourth year Math and CS undergraduates throughout Canada were invited to Vancouver to learn of opportunities for further study in BC and Alberta.

Schools and public awareness:

PIMS works with educators in the primary and secondary schools with various initiatives for students and the general public. These include math fairs, math evenings and conferences such as "Mathematics Unplugged" (Westwood Elementary School) and "Changing the Culture" (SFU, Harbour Ctr). PIMS events specifically for high school students include "Dynamics for High School Students" (U Victoria) and a training camp for Canadian participants in the International Mathematics Olympiad (Calgary).

Technology-based mathematical sciences:

The internet and other technological developments have created new opportunities for mathematical scientists to communicate with each other and with the world at large. In support of these advances, PIMS is supporting the UBC SUNSite (UBC), Interactive Software Modules for learning mathematics (U Alberta) and the Distributed Access Resource Infrastructure project (SFU - CECM).

Teleconferencing is used routinely by PIMS for holding business meetings and to broadcast its Distinguished Lecturer Series to viewers at its sites in Alberta and BC. An ongoing project is to use internet connections to enable individual scientists at remote locations to collaborate on scientific projects in a "face-to-face" manner using specially-equipped computers at their own sites.

PIMS personnel and management:

Board of Directors: The final responsibility for all aspects of the PIMS' operation lies with the Board of Directors. Currently it has 12 members and is chaired by Dr. Hugh Morris, FRSC, a geologist and chair of the Board of Directors of Eldorado Gold Corp.

Scientific Review Panel: This international group of scientists is responsible for the review and selection of proposed scientific programs, selection of the PIMS Postdoctoral Fellows, and advising on long-term scientific planning of the institute.

Executive Committee: Consisting of the Director and the Site Directors at each of the five founding universities, the Executive is responsible for the day-to-day operation management of PIMS' activities.

Support Personnel: The Executive are assisted in the operation of PIMS activities by paid personnel: two Industrial Coordinators, one each in BC and Alberta, and a full-time Scientific Coordinator based at the head office. The PIMS office also has a full-time Administrator, a Program Officer and a full-time secretary. Each site office has part-time secretarial support.

PIMS Scientists and Educators: More than 200 scientists in BC and Alberta contribute their time and energy toward proposing, planning and running PIMS activities. Their enthusiastic support is what has made the PIMS initiative possible. One of the greatest accomplishments of PIMS has been to energize this geographically and scientifically diverse group of researchers, and to create new collaborations among them. Teachers of the mathematical sciences at all levels organize and participate in PIMS programs in the schools, as well as certain scientific programs. They play an especially important role in increasing public awareness regarding mathematical science.

SFU-PIMS Local Advisory Committee: This group of scientists at SFU currently numbers 13 persons from various departments and faculties. The LAC holds regular meetings, chaired by the Site Director, and serves to provide advice, ideas and perspective regarding PIMS policy affecting SFU. In addition, the members serve to communicate information regarding PIMS activities and opportunities to a broad constituency on campus.

Implications for SFU

As a senior partner of PIMS, Simon Fraser University is established as an internationally recognized centre for activity in the mathematical sciences. PIMS also serves to unify the local scientific community, promote interdisciplinary collaboration and provide resources for events at SFU and nearby universities involving scientists worldwide. In addition PIMS is fostering valuable connections between SFU scientists (and students) and the industrial and financial sectors of Western Canada. PIMS has a good working relationship with other SFU organizations, such as the Centre for Experimental and Constructive Mathematics, the Centre for Systems Sciences, and the Institute for Applied Algorithms and Optimization Research including co-sponsorship of events and postdoctoral fellowships.

PIMS will conduct its activities in accordance with University policies. The university, as a signatory to a legal agreement between Simon Fraser University, The University of Alberta, The University of British Columbia, The University of Calgary, The University of Victoria agrees to abide by the terms and conditions in that agreement as they affect the SFU site of PIMS.

Attachment:

Further details regarding management and other aspects of PIMS can be found in the attachment. The legal agreement recognizing PIMS has been circulated to all five PIMS founding universities and at the time of writing has been signed by SFU and others.

Respectfully submitted,



Arvind Gupta
PIMS-SFU Site Director & PIMS Deputy Director

Appendix A

Management Personnel of the Pacific Institute for the Mathematical Sciences

Board of Directors

The Board of Directors have final responsibility for all aspects of the PIm's operation. In particular, the Board ensures fiscal accountability, monitor the operation of the PIm's, and advise the Executive committee.

- **Chair of the Board:** Dr. Hugh Morris holds a Ph.D. in Mining Geology from the University of Witwatersrand, Johannesburg, South Africa and has 44 years of experience in the mineral industry. He is a fellow of the Royal society of Canada and is Chair of the Society's Canadian Global Change Program.

From 1962 to 1979 he held a series of positions with Cominco Ltd. in its Exploration and Mining Departments in several Canadian locations, eventually becoming Director, Exploration for its worldwide activities. In 1979 Dr. Morris became associated with the E & B-Geomex Group of affiliated companies in Calgary, initially as President and Chief Operating Officer of Geomex Minerals Ltd., and in 1981, as President and Chief Executive Officer of E & B Canada Resources Ltd. Following the merger of the E & B-Geomex Group and Imperial Metals Corporation of Vancouver in May 1983, he was appointed Chairman and Chief Executive Officer of Imperial Metals and of three public companies within the Imperial Metals Group. He resigned from these positions in February 1993 to pursue other interests. Currently, he is also Chair of the Board of Directors of Eldorado Gold Corp and the Lithoprobe Project as well as a mineral industry consultant and board member of six other Canadian public companies.

Dr. Morris has demonstrated special interest in national and international scientific and professional associations. He is a member of NSERC's Council and a member of the Standing Finance committee of ICSU. He is past-president of the Geoscience Council of Canada, a past-president of the Geological Association of Canada, and was also Treasurer of the Canadian Geological Foundation from 1987 to 1996. He is a member of the Geological Society of London, the Institute of Mining and Metallurgy, U.K., the Canadian Institute of Mining and Metallurgy, a member of the Association of Professional Engineers of British Columbia and a number of other scientific and professional associations.

- **Dr. Peter Borwein** is a Professor of Mathematics at Simon Fraser University and the Associate Director of the Centre for Experimental and Constructive Mathematics. Prior to joining Simon Fraser University in 1993 he was Professor of Mathematics at Dalhousie University. His research interests are in computational classical analysis and number theory.

He was co-recipient of the Chauvenet Prize in 1993, the Hasse Prize in 1993 and the CUFA/BC Academic of the Year for 1996. Currently he is on the editorial boards of SIAM Review, the Journal of Approximation Theory, Constructive Approximation, The Ramanujan Journal, ETNA and Computational Complexity. He also co-edits the C.M.S./Wiley Series of Advanced Mathematics Books. He recently gave the Frontiers Lectures at Texas A& M in 1996 and the Nagel Lecture at the University of South Florida in 1996.

- **Dr. Bruce Clayman** received his PhD from Cornell University in 1968. He is currently a professor of Physics at Simon Fraser University as well as the Vice-President Research and the Dean of Graduate Studies. His past administrative duties include President of the Canadian Association for Graduate Studies and Acting Dean of Science. He is a member of the Sigma Pi Sigma Physics Honour Society. His research interests include superconductors, impurity states in solids, and layered compounds. He has published over 80 papers in refereed journals and refereed conferences.
- **Mr. Kenneth Foxcroft** served on the board of Directors of Factors Limited, Toronto Dominion Securities (USA) Inc., and of the Ontario Securities Advisory Commission. He has also held the positions of Chairman for Commodity Futures and President for the Forex Association of Canada. Presently, Mr. Foxcroft is the Deputy Chairman & Chief Trading Officer for TD Securities Inc.
- **Dr. Nassif Ghoussoub** is a Professor of Mathematics at the University of British Columbia. He did his undergraduate degree at the Lebanese University in Beirut and obtained his Doctorat d'état in 1979 from the Université Pierre et Marie Curie in Paris. He is a fellow of the Royal Society of Canada and is the current Director of the Pacific Institute for the Mathematical Sciences. His present research interests are in non-linear analysis and partial differential equations.

He was the recipient of the Coxeter-James prize in 1990 and of a Killam senior fellowship in 1992. He was chair of NSERC's grant selection committee for mathematics in 1995-1996 and vice-president of the Canadian Mathematical Society from 1994 to 1996. He is on the editorial board of various international journals and is currently the co-Editor-in-Chief of the Canadian Journal of Mathematics.
- **Dr. Prubha Kundur** is the President and CEO of Powertech Labs Inc, a research subsidiary of BC Hydro. Powertech employs about 100 engineers, scientists and technologists at its labs in Vancouver BC. Dr. Kundur has been an adjunct faculty member at the University of Toronto and is currently an adjunct faculty member at the University of British Columbia.
- **Dr. Peter Lancaster** is a Professor Emeritus and Faculty Professor in the Department of Mathematics and Statistics of the University of Calgary. He has doctoral degrees from the University of Singapore and the University of Liverpool, England, as well as five years experience in the aircraft industry in the 1950's. He came to Canada in 1962 and was elected to the Royal Society of Canada in 1984. His research interests are in matrix and numerical analysis especially as applied to vibrations, systems theory, and signal processing. He is the author or co-author of several texts and monographs and serves on a number of editorial boards. He has completed terms as Vice-President and as President of the Canadian Mathematical Society, and as Vice-President of the Canadian Applied Mathematics Society. He has also served (or is serving) on numerous committees of NSERC and the Royal Society of Canada.
- **Dr. Cooper Langford**, Vice-President Research at the University of Calgary, holds an AB in Chemistry from Harvard and a Ph.D. in Physical Chemistry from Northwestern. He was an NSF (US) post-doctoral fellow in inorganic chemistry at University College, London. He taught at Amherst College, Carlton University, Concordia University and as a visitor at Columbia University before coming to Calgary. He is a co-author of four books and over 200 research publications chapters and articles. He has chaired the Chemistry Department

at Concordia and served there as Associate Vice-Rector for Research. He was a founding Director of the Laboratory for In-organic Materials at Concordia. He has served on a number of NSERC committees and spent two years on secondment as Director of Physical and Mathematical Sciences at NSERC. He has chaired the Ontario Confederation of University Faculty Associations. Dr. Langford is a Fellow of the Royal Society of Canada, the American Association for the Advancement of Science, and the Chemical Institute of Canada. He has held an Alfred P. Sloan Foundation Research Fellowship.

- **Dr. Alex McAuley** was born and educated in Scotland, attended the University of Glasgow, and completed both a Ph.D and (later) a D.Sc. in Chemistry. He was awarded a Fulbright Scholarship to study in the United States and returned to university posts in Scotland prior to moving to Canada in 1975. Since his appointment as professor of chemistry at the University of Victoria, he has served successively as Department Chairman, Dean of Graduate Studies and Associate Vice-President Research. He has also served on National Science committees and as Chair of the Chemistry competition. His research interests include the synthesis of new complex compounds, the influence of ligand structure on the reactivity and stabilisation of less common oxidation states and the kinetics of substitution and electron transfer at encapsulated metal centers. He has published more than 140 papers, lectured widely and supervised over 20 Ph.D. students.
- **Dr. Barry McBride** is Provost and Vice-President, Academic, at the University of British Columbia. Before that appointment he served as Dean of Science since 1990. He received his Ph.D. from the University of Illinois (Urbana) in 1970. He was Department Head of the Microbiology Department at UBC from 1986 to 1989 and Department Head of the Oral Biology Department at UBC from 1981 to 1986. He has consulted with Cominco, Energy Mines and Resources Canada, the National Institute of Health, USA and Ventures West. He is a member of many Professional Committees including the Medical Research Council (where he is also on the Executive Committee), the Standing Committee on Manpower (MRC), Scientific Advisory Council - Alberta Council - Alberta Heritage Foundation for Medical Research and the Canadian Institute for Advanced Research - Research Advisory Council. His major area of research is in ecology and pathogenesis of the microbial flora of man with specific reference to pathogens of the mouth.
- **Dr. Edwin Perkins** is Professor of Mathematics at the University of British Columbia where he was first appointed as a postdoctoral fellow in 1979. He did his undergraduate degree at U. of Toronto and obtained his doctoral degree from the U. of Illinois. His research interests in probability include the general theory of processes, Brownian motion, stochastic differential equations and partial differential equations, interacting particle systems, measure-valued diffusions and stochastic models in population genetics. He has won numerous awards for his research including the Coxeter-James Lectureship (1986) and G. de B. Robinson Award (1996) (Canadian Math. Society), the Rollo Davidson Prize (1983) (Cambridge U.) and a Steacie Fellowship (1992-93) (NSERC). He is a Fellow of the Royal Society of Canada and currently sits on the Academy of Science Council. He is presently on the editorial Boards of the Canadian J. of Mathematics, the Annals of Applied Probability, the Annales de l'Institut Henri Poincaré, and Probability Theory and Related Fields. He has given several invited lectureships including an invited address at the 1994 International Congress of Mathematicians in Zurich.

- Dr. Richard E. Peter received a B.Sc. in Biology from The University of Calgary in 1965 and a Ph.D. from the University of Washington in 1969. Following postdoctoral research in Pharmacology at the University of Bristol, he took up an appointment in the Department of Zoology, University of Alberta, in 1971. Promoted to Professor in 1979, he served as Chairman of Zoology from 1983-1992, and became Dean of Science in 1992. His research is on the brain regulation of reproduction and growth in fish, an area in which he has over 260 publications. Dr. Peter has received numerous honors and awards, including the E.W.R. Steacie Memorial Fellowship in 1980, election as a Fellow of the Royal Society of Canada in 1985 and the Pickford Medal for outstanding contributions to comparative endocrinology. A kit to induce spawning of farmed fish, based on his research, is marketed as OVAPRIM by Syndel Laboratories Ltd., Vancouver.
- Dr. Claudine Simson is Vice-President, Global External Research and Intellectual Property at Northern Telecom. She received her Doctorate in Aeronautical Engineering from the Université Paul Sabatier in Toulouse, France. She is also on the Board of Directors of the Fields Institute for research in the mathematical sciences in Toronto.

Advisory Council

The Board will be assisted by the following Advisory Council who will receive all the relevant documentation. These members will give their input to the Board about PIm priorities and activities at their discretion.

- Larson C. Brodner, Alberta Research Council, Vice-President of marketing.
- Kung Ching Chang, Chinese Mathematical Society, President.
- Bogwhan Dua, University of Lethbridge, Dean of Arts and Science.
- Chris Garrett, University of Victoria, Lansdowne Professor of Ocean Physics.
- Ivan L. Head, University of BC, Chair of South-North Studies.
- John S. MacDonald, MacDonald Dettwiler and Associates Ltd, Chairman of the Board.
- Becky Matthews, BC Ministry of Education, Director of Student Assessment Branch.
- Robert O'Malley, University of Washington, Professor of Applied mathematics.
- William R. Pulleyblank, IBM Research Center, Director of Mathematical Sciences.
- Brent Sauder, Advanced Systems Institute, Executive Director.

The *Steering Committee* of the Board consists of D. Peter (Chair), P. Borwein, N. Ghoussoub, P. Lancaster, A. McAuley and E. Perkins.

Scientific Review Panel

The Scientific Review Panel is responsible for:

- The review and selection of scientific programs and determination of their funding levels:

- The selection of the PImS Postdoctoral Fellows and the PIMS Visiting Fellows; and
- Provide advice on long-term scientific planning for PIMS.
- **David Boyd** received his Ph.D. in Mathematics from the University of Toronto in 1966. At that time he worked in harmonic analysis and in particular interpolation theory for rearrangement invariant spaces. Subsequently his work shifted into number theory, particularly the theory of Pisot and Salem numbers and Mahler's measure. He is particularly interested in the role of computation in pure mathematics. After his Ph.D., he spent a year at the University of Alberta, then moved to the California Institute of Technology where he spent the next four years, and finally moving to the University of British Columbia where he has been a professor of mathematics since 1974. He was awarded the 1978 E.W.R. Steacie Prize in Science for his work on Pisot sequences and Salem numbers. He was the Canadian Mathematical Society's Coxeter-James lecturer for 1979 and was elected to the Royal Society of Canada in 1980.
- **Richard Ewing** is Dean of the College of Science and professor of mathematics and Engineering at Texas A&M University. He also is Director of the Institute for Scientific Computation and the Academy for Advanced Telecommunications & Learning Technologies at Texas A&M. Prof. Ewing is an expert in scientific computation. His recent research deals with the multitude of problems that arise from numerical simulation and modelling of multiphase flow and transport in porous media as applied to ground water contaminants and reservoir modelling. He has an extensive background in consulting/advising with the public and private sector especially the petroleum industry.
- **Ronald Graham** is currently Chief Scientist of AT&T Research. He was President of the American Mathematical Society from 1993-95. His other current obligations include: membership of the Scientific Advisory Committee of the Santa Fe Institute, of the National Research Council, Mathematical Sciences Education Board, and of the Joint Policy Board on Mathematics. He is Treasurer of the National Academy of Sciences (1996-2000). Dr. Graham's academic awards include: Membership in the National Academy of Sciences and Fellowships in the American Academy of Arts & Sciences, the New York Academy of Sciences, and the American Association for the Advancement of Science. He was the Scientist of the Year, World Book Encyclopedia in 1981, and won the Polya Prize in Combinatorics in 1972, the Carl Allendorfer Award of the Math. Assoc. of America in 1990, a Lester Ford Award of the Math. Assoc. of America, in 1991, and the Euler Medal of the Institute of Combinatorics in 1994. Ron Graham's current mathematical interests include combinatorics, number theory, graph theory, discrete and computational geometry, theoretical computer science, and applications thereof. In all of these areas he has made fundamental contributions. He is also a very gifted juggler.
- **Wolfgang J.R. Hofer** is a professor of Electrical and Computer Engineering at the University of Victoria and holds the NSERC/MPR Teltech Industrial Research Chair in RF-Engineering. He is a fellow of the Institute of Electrical and Electronics Engineers (IEEE) and of the Advanced Systems Institute (ASI) of British Columbia. His expertise lies in computational electromagnetics, numerical modeling of electromagnetic fields and structures, microwave and millimeter-wave circuit design, and microwave measurements. Prof. Hofer has been a visiting scientist or professor at AEG-Telefunken in Germany, the Communications Research Centre in Ottawa, and the Universities of Grenoble, Rome - Tor Vergata, Nice - Sofia

Antipolis, Munich, and Duisburg. He is the managing editor of the International Journal of Numerical Modelling since 1988.

- **John Kalbfleisch** received his Ph.D. from the University of Waterloo in 1969 and joined the faculty at Waterloo as Associate Prof. in the Department of Statistics in 1973. Prior to this, he held appointments as a Research Associate at University College, London and as an assistant professor at the State University of New York, Buffalo. At Waterloo he was promoted to professor in 1979, was Chair of the Department of Statistics and Actuarial Science from 1984 to 1990 and has been Dean of the Faculty of Mathematics since 1990. Dr. Kalbfleisch has also been a Visiting Scientist at the Institut Jules Bordet in Brussels, Belgium, and at the Fred Hutchinson Cancer Research Centre in Seattle, Washington. He has also held appointments as a visiting professor in the Department of Biostatistics, University of Washington; in the Department of Statistics, North Carolina State University, Raleigh; at the Centre for Statistics, University of Lancaster; in the Department of Biostatistics at the University of Michigan; and in the Department of Epidemiology at the University of California, San Francisco. He is an elected Fellow of the American Statistical Association and the Institute of Mathematical Statistics. In 1994, he was elected Fellow of the Royal Society of Canada and was awarded the Gold Medal of the Statistical Society of Canada. Dr. Kalbfleisch has authored/co-authored more than 60 publications in refereed journals, books and conference proceedings. As well, he has co-authored one book.
- **Richard M. Karp** was born in Boston, Massachusetts in 1935 and was educated at the Boston Latin School and Harvard University, where he received his Ph.D. in Applied Mathematics in 1959. From 1959 to 1968 he was a member of the Mathematical Sciences Department at the IBM Thomas J. Watson Research Center. From 1968 to 1994 he was a professor at the University of California, Berkeley. From 1988 to 1995 he was also associated with the International Computer Science Institute in Berkeley. In 1994 he retired from Berkeley and was named University Professor (Emeritus). In 1995 he moved to the University of Washington, where he has appointments in Computer Science and Molecular Biotechnology. The unifying theme in Karp's work has been the study of combinatorial algorithms. His 1972 paper "Reducibility Among Combinatorial Problems," demonstrated the wide applicability of the concept of NP-completeness. Much of his subsequent work has concerned the development of parallel algorithms, the probabilistic analysis of combinatorial optimization problems, and the construction of randomized algorithms for combinatorial problems. His current research is concerned with strategies for sequencing the human genome. Karp has received the U.S. National Medal of Science, Turing Award (ACM), the Fulkerson Prize (AMS and Math. Programming Society), the von Neumann Theory Prize (ORSA-TIMS), the Lanchester Prize (ORSA) the von Neumann Lectureship (SIAM) and the Distinguished Teaching Award (Berkeley). He is a member of the National Academy of Sciences and the National Academy of Engineering, and holds four honorary degrees.
- **Alistair Lachlan** obtained his Ph.D. from the University of Cambridge in 1964 and is currently a professor of mathematics at Simon Fraser University. Prof. Lachlan was elected as a Fellow of the Royal Society of Canada in 1974. He has served as the Vice-President of the Canadian Mathematical Society (1985-1987), was a member of the NSERC math GSC (1984-1987), was a member of the selection panel for speakers in Mathematical Logic at the 1990 ICM, and served on the steering committee for the CRM (1991-1995). He is and has been an editor for a number of journals including annals of pure and applied logic and the

lecture notes in logic.

- **Bernard J. Matkowsky** presently holds the John Evans Chair in Applied Mathematics at Northwestern University. He received his Ph.D. from New York University in 1966. He was at Rensselaer Polytechnic Institute until 1978 and has been at Northwestern University since then. He is the editor of 7 journals (SIAM J. Appl. Math., European J. Appl. Math., Int'l. J. Wave Motion, Random and Computational Dynamics, J. Materials Synthesis and Processing, Int'l. J. SHS, Applied Math. Letters) and one book series (Springer Appl. Math. Sci. series). His honors include being a Fulbright-Hayes Fellow in 1972-1973 and a Guggenheim Fellow in 1982-1983. His research areas include asymptotic and perturbation methods for ordinary and partial differential equations, nonlinear stability and bifurcation theory, stochastic differential equations, and applications to fluid dynamics, elasticity, combustion, flame propagation, and solid state physics.
- **Robert V. Moody** is professor of mathematics at the University of Alberta. He received his Ph.D. from the University of Toronto in 1966 and spent most of his academic career at the University of Saskatchewan before coming to Alberta in 1989. He is best known for the discovery, independently with V. Kac, and subsequent investigations of the Kac-Moody Algebras, for which he was awarded the 1994-1996 Eugene Wigner Medal jointly with Kac. He has presented both the Coxeter-James Prize Lecture (1978) and the Jeffrey-Williams Prize Lecture (1995) to the Canadian Mathematical Society. He has served nationally on the Scientific Advisory Boards of both the Centre de Recherches de Mathematique and the Fields Institute for Research in the Mathematical Sciences, and on the Council of the Academy of Science, Royal Society of Canada.
- **Nicholas Pippenger** received his Ph.D. from MIT in Electrical Engineering in 1974. Prior to joining UBC Computer Science department as a professor in 1988, he was a staff member at IBM for sixteen years and at Draper Laboratories for three years. For his last two years at IBM he was an IBM Fellow. His other distinctions include a 1991 UBC Killam Research Prize, a 1983 IBM Outstanding Technical Achievement Award, and a 1981 IBM Outstanding Innovation Award. He has published over 90 research articles in the theory of computation and communication and discrete mathematics.
- **Gordon Slade** received his Ph.D. from the University of British Columbia, in Mathematics, in 1984. He is currently a professor in the Mathematics department at McMaster University. He was the 1995 Coxeter-James Lecturer of the Canadian Mathematical Society, and was one of five Canadian mathematicians invited to give addresses at the 1994 International Conference of Mathematicians in Zurich. In joint work with T. Hara, he has given a rigorous proof of the long-standing conjecture that percolation (and also other important models in statistical physics) exhibit mean-field behaviour in high dimensions.
- **Gang Tian** received his Ph.D. from Harvard University in 1988. After positions at Princeton University and the State University of New York at Stony Brook, he went to the Courant Institute of Mathematical Sciences at New York University in 1991 as full professor. He is currently a professor in Massachusetts Institute of Technology. Prof. Tian is a recipient of the Alfred P. Sloan research fellowship (1991-1993). He presented a 45-minutes invited address at the International Congress of Mathematicians in Kyoto in 1990 and the Bergmann Memorial Lecture at Stanford University in 1994. The same year, he received the 19th Alan Waterman

Award from the National Science Foundation. In 1996, Prof. Gang Tian received the Veblen Prize of the American Mathematical Society.

Executive

The executive committee consists of the Director, the five Associate Directors, and any other members appointed by the Board as required. The Executive is responsible for the day to day management of the PImS as delegated by the Board.

N. Ghoussoub, PIMS Director, UBC, Mathematics
A. Gupta, PIMS Deputy Director and SFU-Site Director, Computer Science
F. Ruskey, UVic-Site Director, Computer Science
D. Rolfsen, UBC-Site Director, Mathematics
M. Lamoureux, UC-Site Director, Mathematics and Statistics
J. Carrière, UA-Site Director, Mathematical Sciences

SFU Local Advisory Committee

Chair: A. Gupta, Computer Science
Brian Alspach, Math & Stats
Jon Borwein, Math & Stats
Peter Borwein, Math & Stats
James Delgrande, Director, Computing Science
Malgorzata Dubiel, Math & Stats
Lou Hafer, Computing Science
Pavol Hell, Math & Stats, Computing Science
Tiko Kameda, Computing Science
Mary Catherine Kropinski, Math & Stats
Alistair Lachlan, Math & Stats
Keith Promislow, Math & Stats
Mehrdad Saif, Engineering Science

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**Simon Fraser University
The University of Alberta
The University of British Columbia
The University of Calgary
The University of Victoria**

(collectively the Universities and individually a University)

The Universities have determined that an institute to be known as the Pacific Institute for the Mathematical Sciences (PIMS) should be established to facilitate and promote the mathematical sciences in Alberta and British Columbia.

DEFINITIONS

Affiliated Institutions means an institution in the category of Affiliated Institutions established by the Board pursuant to Article 4.2.9

Board means the Board of Directors established pursuant to Article 4.;

Director means the Director of PImS appointed pursuant to this Agreement;

Site Director means a Site Director of Pflms appointed pursuant to this Agreement;

PImS Activities means those research, educational, and other activities carried out pursuant to this Agreement and which are funded by PImS using moneys held by the Administrative Centre on behalf of PImS or moneys received by or conveyed to the Universities by third-parties with the intent that the funds be used for PImS Activities,

or which PImS and the Universities determine will be a PImS Activity by operation of this Agreement;

Senior Academic Administrator means the President, a vice-president, or a Faculty Dean of a University.

All other terms are defined in the Article in which the term first appears and are thereafter capitalized.

1. ESTABLISHMENT OF PImS

PImS is established as the umbrella organization of the Universities pursuant to which each of the Universities will participate in the Board panels, and committees constituted under this Agreement and through which each of the Universities may commit staff and resources to the fulfillment of the mission of PImS.

2. OBJECTIVES

The objective of PImS to facilitate and promote the mathematical sciences in Alberta and British Columbia will be achieved by:

2.1 Strengthening ties and collaboration between the mathematical scientists in the academic community, in the industrial and business sector, and in government;

2.2 Enhancing education and training in mathematical sciences, and broadening communication of mathematical ideas;

2.3 Creating strong mathematical partnerships and links within Canada and organizations in other countries, with a focus on the nations of the Pacific Rim; and

2.4 Promoting research in mathematics.

3. RESTRICTIONS ON COMMITMENTS

3.1 Except for the appointment of individuals to the Board, panels and committees and the appointment of a Site Director and except for the obligation of the University of British Columbia to act as Administrative Centre, no institution is by execution and delivery of this Agreement nor as a result of any actions taken or decisions made by PImS or any one or more of the Universities pursuant to this Agreement required to commit staff or resources to the fulfillment of the mission of PImS unless by separate written agreement or commitment to the other Universities.

3.2 The purpose of this Agreement is not to form a joint venture or partnership between the Universities but to establish a procedure for achieving shared goals in PImS and for collaboration in research.

4. BOARD OF DIRECTORS

4.1 Membership

The Board will consist of:

4.1.1 A Senior Academic Administrator from each of the Universities appointed by the University, for such term or terms as the appointing University may determine;

4.1.2 The Director;

4.1.3 Three Board-appointed mathematical scientists, including at least one from each of Alberta and British Columbia;

4.1.4 Five Board-appointed representatives from the business, industry, and resource sectors and the professional societies. Before making appointments, the Board will invite

nominations from individuals and organizations actively interested in PImS. Appointments will be made at the Annual General Meeting and nominations will be accepted up to (and including) the AGM;

4.1.5 Observers named by those governmental agencies providing major funding for PImS (one per agency).

Normally, Board Members in categories 4.1.3 and 4.1.4 will serve terms of 3 years.

4.2 Powers, Duties, and Responsibilities

The Board will have final responsibility for all aspects of PImS operations. In particular, the Board will set policy, monitor operations, and establish mechanisms for fiscal accountability. Specifically, the Board will have the following powers, duties and responsibilities:

4.2.1 Elect a Chair from its members in category 4.1.4;

4.2.2 Elect a Deputy Chair from its members;

4.2.3 Appoint, from among the Board members, a Steering Committee responsible for monitoring the day-to-day operations of PImS;

4.2.4 Approve PImS expenditures and utilization of resources;

4.2.5 Determine the use of discretionary funds from federal, provincial, corporate, and private sources and any general revenues resulting from PImS activities;

4.2.6 Appoint and replace or remove the Director;

4.2.7 Appoint and replace such committees, scientific and administrative officers as herein provided or as deemed necessary by the Board to implement the objectives of PImS with such powers, duties and responsibilities as may be assigned or delegated by the Board;

4.2.8 Publicize and promote PImS and PImS activities to industry, government, the research community, and the Canadian public;

4.2.9 Establish the category of Affiliated Institutions and set the rules for the admission and removal of Affiliated Institutions; and

4.2.10 Determine the rights, privileges, and the obligations of Affiliated Institutions and determine whether an affiliate status should be granted.

4.3 Annual General Meeting

The Board will have an AGM to consider the forthcoming year's activities, to approve the Annual Report of the Director, to discuss matters related to PImS orderly operation, and to deal with such other matters as may properly be placed before the AGM. The AGM will be conducted as follows:

4.3.1 At least one month's notice will be given of an item to be considered at an AGM. The Chair of the Board will chair the AGM.

4.3.1 Each Board Member will have one vote. A quorum will consist of more than fifty percent of Board members or their proxies. Members may be represented by proxy.

4.3.2 Decisions will be taken on the basis of strict majority of those present or represented by proxy except that changes to this Agreement and a replacement of the Administrative Centre will require a two-thirds majority of the full membership of the Board and a ratification by two-thirds majority of the Universities.

4.3.3 The Site Directors or their designates will attend the AGM and may address the meeting with the consent of the meeting but may not vote.

4.4 Steering Committee

The Board will appoint annually a Steering Committee at its AGM. The committee will consist of:

4.4.1 The Deputy Chair of the Board who will act as the chair of the Steering Committee;

4.4.2 Four other members of the Board elected annually by the Board, including at least one from each of the board categories 4.1.1 and 4.1.3; and

4.4.3 The Director will be ex-officio on the Steering Committee.

The Steering Committee will:

4.4.4 Serve as a group for the Director to consult on matters of policy development and interpretation;

4.4.5 Review and recommend to the Board proposed changes to this Agreement;

4.4.6 At about five months before the beginning of the fiscal year, consult with the Director, and advise, on budget preparation for the pending fiscal year;

4.4.7 Review the budget before presentation to the Board at its AGM; and

4.4.8 Recommend to the Board, on the advice of the Director, the appointment of an auditor.

4.5 Executive Committee

The Board will appoint an Executive Committee to be responsible for the day-to-day management of Pims with such delegated authority of the Board as the Board considers is required, including the determination of the structure and membership of the Program Committee and its sub-committees. The Executive Committee will consist of:

4.5.1 The Director;

4.5.2 The Site Directors;

4.5.3 Such other members as the Board considers are required.

5. Director

The Director will be appointed by the Board, on the recommendation of a Search Committee appointed by the Board. The Director will serve for a three to five-year term as determined by the Board and may be re-appointed for subsequent three to five-year terms. The Director will be the Chief Executive Officer of the Institute and will be located at the Administrative Centre. The Director will:

- 5.1 Provide scientific leadership;**
- 5.2 Serve as a member of the Board and ex-officio member of the Steering Committee;**
- 5.3 Chair the Executive Committee, and the Program Committee;**
- 5.4 Serve as a member of the Scientific Review Panel;**
- 5.5 Solicit and initiate programs with the assistance of the Program committee;**
- 5.6 Provide to the Steering Committee and the Board annual financial reports and semi-annual activity reports;**
- 5.7 Appoint the Chair and Co-Chairs of the Program Committee and its sub-committees, as required;**
- 5.8 Appoint the Chair of the Scientific Review Panel; and**
- 5.9 Undertake such additional duties and responsibilities as may be requested by the Board.**

6. Site Directors

6.1 A Site Director will co-ordinate PImS Activities at each University. A University's Site Director will be appointed by the University in consultation with the Director. The Board may remove a Site Director for cause but any replacement must be the subject of consultation and must have the consent of the University.

6.2 Normally, a Site Director will be appointed for a three-year term, renewable once.

6.3 The responsibilities of the Site Director will include:

6.3.1 Co-ordinate PImS' Activities and manage PImS' funds at the Site Director's University;

6.3.2 Provide the Board with annual reports of activity at the Site Director's University;

6.3.3 Attract, plan and develop partnerships and activities in all areas supported by PImS; and

6.3.4 Perform such additional duties as may be assigned by the Director.

7. Deputy Director

The Board of Directors will appoint, on the recommendation of the Executive committee, one Site Director as Deputy Director. The Deputy Director will serve for up to 5 years and may be reappointed. The Deputy Director will:

- 7.1** Act as Site Director at his or her University;
- 7.2** Serve as acting Director during lengthy absences of the Director or in the event the Director is otherwise unable to perform the duties of the Director and;
- 7.3** Serve as an ex-officio member of the Board of Directors.

8. SCIENTIFIC REVIEW PANEL

8.1 The Chair of the Scientific Review Panel will be appointed by the Director from the members of the panel and will be responsible for:

- 8.1.1** The review and selection of scientific proposals concerning research in the mathematical sciences and determination of their funding levels;
 - 8.1.2** Providing advice on long-term scientific planning for PImS; and
 - 8.1.3** Recommending to the Board on the appointment and replacement of members of the Scientific Review Panel.
- 8.2** Proposals for activities not covered by Article 8.1.1 will be referred to the Scientific Review Panel for information and comment.
- 8.3** Normally, there will be 10 to 12 members in the Scientific Review Panel, composed of authorities in the sciences and engineering who are actively engaged in mathematical sciences. The interests of such members must reflect a balance among the various areas of mathematics and its applications.
- 8.4** The Director will be the only member of the Executive or Program Committee to serve on the Scientific Review Panel.

9. PROGRAM COMMITTEE

The Program Committee will provide the program leadership and planning for PImS activities designed to meet the objectives of Article 2. Subject to Article 5.7, the form of the Program Committee and its sub-committees, and the members thereof, will be determined by the Executive Committee as required.

10. INITIAL APPOINTMENTS

The Universities agree that upon the effective date those persons named in Schedule A will be deemed appointed to the Board and to such other Committees and Panels as are indicated to serve until the first AGM of the Board at which time the membership of the Board and other Committees and Panels will be appointed, reappointed, replaced, or elected in accordance with the provisions of this Agreement.

11. ADMINISTRATIVE CENTRE

11.1 The Universities appoint The University of British Columbia as the Administrative Centre.

11.2 The powers, duties and responsibilities of the Administrative Centre will be:

11.2.1 To receive and administer funds paid to PImS in accordance with this Agreement;

11.2.2 To maintain proper books and accounts; to provide the Board and PImS officers with information to assist in the financial management of PImS; to provide statements of expenditure ;

11.2.3 To transfer to the Universities, as received, those funds which are budgeted for the PImS activities at their sites;

11.2.4 To house PImS administrative staff on negotiated terms;

11.2.5 To receive and administer third-party funds specifically designated as contributions to PImS Activities and, as Trustee of those funds, to act and do those things that are required to ensure the terms of contribution are met. Nothing in this Article will preclude funds specifically designated as contributions to PImS Activities being received and administered by the University which is to be the primary beneficiary of the contribution on the understanding that the Administrative Centre will then have no obligation of trust in respect of such contributions, however, the receiving University will have the obligation of reporting the contribution to PImS.

11.3 Relocation

Subject to the terms of any funding agreement with NSERC and with the agreement of the University chosen as the new Administrative Centre, the Board may relocate the Administrative Centre upon a two-thirds vote of the full membership of the Board and a two-thirds vote of all the Universities. The outgoing Administrative Centre agrees to do everything necessary to effect an orderly transfer of the responsibilities of Administrative Centre consistent with the agreements and obligations the Administrative Centre has entered into on PImS behalf.

12. EMPLOYEES AND EMPLOYMENT

Individuals hired with PImS funds will be employed in accordance with the applicable policies of the University by which they are paid.

13. OWNERSHIP OF EQUIPMENT

13.1 Minor Capital Equipment

Minor Capital Equipment (capital equipment costing less than \$25,000 and purchased with PImS funds) will be the property of the purchasing University. The purchasing University agrees to allow other Universities to use the equipment for PImS activities on reasonable terms. Service and user fees, if any, may not exceed internal use rates and may be applied only if the University charges internal users for the same use or services.

13.2 Major Capital Equipment

Major Capital Equipment (capital equipment costing more than \$25,000 and purchased with PImS funds) will be held in trust by the purchasing University as legal owner for the benefit of all the Universities. The purchasing University agrees to allow other Universities to use the equipment for PImS activities on reasonable terms. Service and user fees, if any, may not exceed internal use rates and may be applied only if the University charges internal users for the same use or services.

13.3 Maintenance

The University at which Major Capital Equipment is located will keep the equipment in good repair during its useful life span.

13.4 Relocation/Disposal

13.4.1 The Board may direct that Major Capital Equipment be relocated and the University at which the equipment is located agrees to comply with the request. If the relocation is permanent or indefinite, the receiving University will assume ownership. The costs of relocation will be paid by PImS.

13.4.2 The Universities agree to notify PImS if any Major Capital Equipment is no longer required for PImS activities. They may require the equipment to be relocated or may authorize the University to dispose of the Major Capital Equipment in accordance with the University's policies. Net proceeds from the disposal of PImS Capital Equipment will be returned to PImS or used by the University for purposes approved by PImS.

13.4.3 Minor Capital Equipment which is no longer required for PImS activities may be reassigned or disposed of in accordance with the University's policies and the proceeds, if any, may be retained by the University.

14. CONDUCT OF PImS ACTIVITIES

Participants in PImS Activities will comply with the applicable policies of their Universities. Applicable policies may include, but are not limited to, use of human subjects, health and safety, intellectual property, publication, the conduct of research, scholarly integrity, conflict of interest, ethics, environmental protection, and animal care.

15. INTELLECTUAL PROPERTY

15.1 Intellectual Property includes, but is not limited to, substances, processes, formulations, technical information, reports, photographs, drawings, plans, specifications, models, prototypes, inventions, patterns, samples, software, designs, or know-how, whether or not protectable by patent, copyright, industrial design, or trade secret law.

15.2 Intellectual Property made available for PImS Activities and owned by the Universities and/or individual participants before the effective date of this Agreement will continue to be the property of the owner and use of the Intellectual Property will be restricted, unless otherwise agreed, for the purposes of PImS Activities. No publication, commercial use, or disclosure of such Intellectual property will be made without the written consent of the owner.

15.3 Unless another written arrangement is made, Intellectual property arising from PImS Activities and which is conceived and developed solely by the individual participants of one University will be owned by that University or the individual participants in the accordance with the applicable policies of the participants' University.

15.4 Unless another written arrangement is made, Intellectual Property arising from PImS Activities which is jointly conceived and developed by individual participants from more than one University will be jointly owned by the participants' Universities and/or the individual participants in accordance with the applicable policies of the participants Universities.

16. CONFIDENTIALITY

Unless otherwise agreed, it is understood that PImS' Activities under this Agreement are non-confidential. If confidential data or information (Confidential Information) must be exchanged or communicated, the University or individual participant which communicates Confidential Information must clearly identify the information as Confidential Information; the recipient of Confidential Information, in accepting the Confidential Information, then has the obligation to take all reasonable measures to maintain the confidentiality of the information.

17. INDEMNIFICATION

17.1 Each University is liable for its own losses, costs, damages, and expenses of any nature which it may suffer, sustain, pay or incur, by reason of any matter or thing arising out of, or in any way attributable to, PImS Activities except where such losses, costs, damages, and expenses are the result of the willful breach of any term of this Agreement by another University, or another University's employees, agents, or subcontractors in which even a University not in breach will be entitled to recover such losses, costs, damages, or expenses from the University in breach.

17.2 Each University will indemnify and hold harmless the other Universities, their employees, agents, or subcontractors from any and all actions, claims, demands, and costs whatsoever arising directly or indirectly out of the indemnifying University's performance of this Agreement or the performance of the indemnifying University's employees, agents, or subcontractors.

17.3 Notwithstanding the above, the Universities recognize that specific research activities may require different arrangements. In such cases, the arrangements will be in writing and will take precedence over provisions of this Agreement.

18. DISPUTE RESOLUTION

18.1 Mediation

Disputes which the Universities cannot resolve by negotiation will be submitted first to mediation according to the current mediation rules published by Alternative Resolutions, Inc.

18.2 Arbitration

Disputes which the Universities cannot resolve by mediation will be submitted to arbitration using the British Columbia Arbitration Centre Commercial Rules. The Universities which are parties to a dispute will appoint an arbitrator to adjudicate the issue, and the arbitration

will be held in a location selected by the arbiter after having consulted with the parties and having regard for the traveling expenses the parties will incur. If the Universities involved cannot agree on one arbitrator, each will appoint one arbitrator and the appointed arbitrators will appoint a voting Chair, and the arbitrators so chosen will constitute the panel.

18.3 Binding Decisions

The arbitrator or panel decision, which will require a two-thirds majority, will be binding on the parties. The Universities will each bear its own proportionate share of arbitration costs unless or until otherwise awarded by the arbitrator or panel.

18.4 Criteria

In negotiation, mediation and arbitration, the decision makers will first refer to this Agreement, and the intentions of the parties, in that order, to assist in resolving disputes.

19. CONTRACTING

Contracting for activities to be undertaken by PImS will be negotiated through and entered into by the University at which the majority of the activity will be carried out (as sole or prime contractor) or through the Administrative Centre, whichever is appropriate. The Universities will facilitate contracting for funded PImS' activities, subject to PImS related contracts fully complying with the contracting University's applicable requirements. PImS' Director will ensure that the Universities are informed of initiatives which may lead to contracts for PImS' activities and PImS' researchers will involve the University's contracts administration in the preparation of, and obtain their approval for, any sponsorship proposal which may result in a contract.

20. WITHDRAWAL

A University may withdraw from PImS upon one year's written notice. In the event a University withdraws, the remaining Universities will continue with PImS on the terms and conditions herein except that the terms and conditions will be changed and modified where necessary to reflect the reduced number of Universities participating in PImS. A withdrawing University will provide for an orderly wind-up of PImS' activities at the University and will refund to PImS any unexpended uncommitted funds advanced by PImS through the Administrative Centre for PImS' activities.

21. AMENDMENT

This Agreement may be amended by written agreement among two-thirds of the Universities. A dissenting University may withdraw, the effective date of withdrawal to be determined by negotiation between PImS and the withdrawing University.

22. TERMINATION

This Agreement may be terminated at any time on the written approval of all the Universities.

23. MISCELLANEOUS

23.1 Interpretation

This Agreement will be interpreted in accordance with the applicable laws of the Province of British Columbia and of Canada.

23.2 Delays in Payments

Each University acknowledges to the others that delay in reporting or accounting may result in the reduction of payments to PImS and consequential reductions in the moneys paid by the Administrative Centre to the delinquent University.

23.3 Uncontrollable Circumstances

No University will be liable to any of the others for any failure or delay in performance caused by circumstances beyond its control including, but not limited to, acts of God, fire, labour difficulties, or government action.

23.4 Enforcement

No failure to enforce any provision of this Agreement will be construed as a waiver of the provision or a waiver to enforce each and every provision.

23.5 Waiver of Breach

Waiver of any breach will not be deemed to be a waiver of any other or future breach, even if similar in nature.

23.6 Further Assurances

The Universities will do all acts and execute all further assurances as required to give effect to the terms of this Agreement and the intentions of the Universities.

23.7 Survival of Certain Provisions

The Confidential Information, Intellectual Property, and Indemnity terms of this Agreement will survive the earlier termination of this Agreement for an additional five years.

23.8 Notice

Required notices under this Agreement will be given by prepaid post, courier, or electronic transmission means to the address set forth on the parties' execution document. Notices delivered by prepaid post will be deemed received on the fifth business day following dispatch. Notices delivered by courier or electronic transmission means will be deemed received on the business day following the day of dispatch.

23.9 Overhead

The Universities agree not to charge overhead or other levies on grants received on behalf of PImS or to support PImS' activities. Overhead may be charged on contracts in accordance with the contracting University's policies.

24 EFFECTIVE DATE

This Agreement will come into force on the latest date of execution by all the Universities.

