UBC Reports

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Asia Pacific Business Institute opens

UBC President Dr. David Strangway and other UBC officials joined Premier Bennett and federal Energy Minister Pat Carney at the official opening of the Asia Pacific Business Institute on March 21.

Located in the new World Trade Centre -- Canada's "gateway to the Pacific" -- the institute brings together the expertise of universities, government, labor and business to improve Canada's trade opportunities in Asia.

The non-profit organization is the result of a joint application by B.C.'s three universities to the federal government under Ottawa's Centres of Specialization Program.

The federal government has provided $625,000 in seed money to help the institute become a self-supporting educational facility encouraging the growth of Canadian business opportunities in the Asia Pacific region.

The institute's mandates is to:

* Forge a partnership between Canadian business and academic communities that encourages an exchange of information;

* Provide programs tailored to the specific needs of businesses with interests in the Asia Pacific region; and

* Foster research on Asian trade and business.

Mr. Eugene Nesmith, chairman of the institute's board of directors, drew the audience's attention to the team approach used by the Japanese to increase overseas trade.

Information critical to business growth is viewed by the Japanese "not as something to be hoarded but rather analysed and re-circulated," said Mr. Nesmith, who is also president and chief executive officer of the Hong Kong Bank of Canada.

"In Japan, the flow of information about world-wide technological and marketing development is phenomenal and is encouraged by symposia, publications and foreign visits.

"This gives Japan's international competitiveness its cutting edge."

Institute board members are drawn equally from the academic and business communities. Representing UBC are Dr. Peter Burns, dean of the Faculty of Law, and Dr. Terry McGee, director of the Institute of Asian Research.

Executive director of the institute is Dr. Joseph Weiler of UBC's Faculty of Law. He said the institute decided to locate as close to the business community as possible -- "a short walk away so you can drop in and talk to us, use our library and reading room and attend our instructional programs.

"We wanted to be close to the institutions with which we will work to develop our services, such as the Vancouver Board of Trade, Asia Pacific Foundation of Canada, Commercial Dispute Resolution Centre and the Japanese External Trade Organization."

He said that if the institute was successful, the lessons learned could be applied to other subject areas where the academic, government and business sectors could be melded into a unit providing new educational services.

Six seminars have already been organized by the institute that will take place in Victoria, Vancouver and Toronto on subjects such as business strategies for Southeast Asia and overseas Chinese investment in Canadian real estate.

Pointing to the importance of joint university, labor, government and business links to improve trade opportunities with the Pacific Rim, Premier Bill Bennett officially opened the Asia Pacific Business Institute on March 21. Officials at the opening included, from left to right, Mr. Eugene Nesmith, chairman of the institute's board of directors, Vancouver Alderman George Puil and UBC President David Strangway.

Scientist Honored

Dr. Michael Smith of UBC's biochemistry department has been elected a fellow of the prestigious Royal Society of London. He is the fourth UBC faculty member so honored. The others are Dr. Harold Copp, former head of UBC's physiology department, Dr. J.H. Quastell, former member of UBC's neurological sciences division and a resident scientist at the TRIUMF cyclotron project on the UBC campus, and Dr. Maurice Pryce, former member of UBC's physics department. Dr. Smith has an international reputation for his basic research in genetics.
He developed a method to modify specific genes on cell chromosomes, a technique now used in genetic laboratories around the world to change specific genes in a predetermined way.

Draft planning document circulated

President David Strangway told Senate last week that an "agenda of important issues" is being developed for widespread discussion and debate throughout the University.

A draft long-range planning and mission statement has been circulated to UBC deans and department heads and has been the subject of discussions with alumni and student groups, the president said.

Discussions with other UBC groups will continue in the next few weeks, he said, with the aim of finalizing an agenda of important issues by June 30.

When the agenda is decided on, work will start on developing a set of answers to the questions raised in the planning-mission statement.

In some cases, the president said, the questions may be of such importance that it will be advisable to form task forces to develop a clear set of recommendations.

All this will lead to policy statements which will be debated by appropriate UBC bodies, e.g., the Senate and Board of Governors.

Some of the questions and answers under development may be obvious, the president said, "but I want the University community to have the opportunity to debate them.

"It's important that we debate whether we want to reaffirm our commitment about the current direction of the University or whether we should look at some newer direction or at least the thrusts and roles of the University within a system of colleges and universities in British Columbia."

Last week's progress report to Senate by the president on development of long-range planning guidelines came less than six months after he became UBC's chief executive officer. At his first Senate meeting in November last year, Dr. Strangway made it clear that long-range planning about UBC's future was a top-priority item on his agenda.

Special Ed enrolment suspended

UBC's Senate has approved a statement which will have the effect of suspending enrolment in the first three years of the program leading to the Bachelor of Education degree in Special Education.

Senate has actually already suspended enrolment in the first and second years of the Faculty of Education program and the effect of the statement approved on March 19 is to add the third year to the enrolment ban.

Senate was told that the resources of the faculty are still insufficient to warrant a further intake of students, "despite efforts on the part of a community group to raise funds for the support of research and instruction in special education."

The statement says qualified students will be accepted into the fourth year of the degree program. It adds that students with a particular interest in special education should enrol in the appropriate year of the B.Ed. elementary program with a concentration in special education.

Acting Education dean Dr. Douglas McKie told Senate the faculty would offer special education streams in the revised B.Ed. programs currently under consideration by the Senate curriculum committee.

Law student Patricia Arthur said that as a former teacher she was aware of the need for properly trained special education teachers in B.C. "I realize we have budget and retrenchment problems," she said, "but I don't understand why we're not addressing the question of (job) markets in the sense that the value of special education is being realized in the school system."

Academic vice-president Daniel Birch told Senate that the education faculty is "virtually a leader in Canada" in special education programs at the graduate level and in post-baccalaureate diploma programs.

In addition to graduate programs, he said, the faculty is committed to implementing a resolution calling for some special education training for all education students, which it has not been able to initiate because of budget difficulties.

He added: "The picture is not as bleak as it appears. The faculty is choosing to put its resources where it's felt they will do the most good, given limited resources."

The Ayerst Award of the Canadian Biochemical Society has been won by Dr. Pieter Cullis of UBC's biochemistry department. Dr. Cullis won the annual award for his research into the structure of cell membranes and the way they fuse. In his more recent work, he has developed a method of delivering anti-cancer drugs to malignant cells.

A focus on UBC centres of excellence

Premier Bennett and Finance Minister Hugh Curtis announced Feb. 11 that the provincial government had identified six areas of excellence for funding at B.C. universities.

The University's strength in four of the areas selected by the provincial government -- forestry, international business and trade, links with cultural industries and Pacific Rim studies -- were outlined in previous issues of UBC Reports. This issue deals with the remaining two areas selected and earmarked for funding by Victoria -- biotechnology and computer systems.

Much of UBC's computer systems research is carried out through a new Centre for Integrated Computer Systems Research (CICSR) bringing together scientists and engineers in the computer science department, Faculty of Science, and the electrical and mechanical engineering departments in the Faculty of Applied Science.

Faculty members associated with the centre hold research grants from government agencies and the private sector worth more than $2 million. Discussions have recently taken place for joint research projects with IBM, Northern Telecom, MacDonald Dettwiler and Associates and other companies.

Computer Communications

A major breakthrough occurred last year when a unique soft-ware program was unveiled that established an early lead for Canada in the international multi-million-dollar market for electronic messaging, sometimes referred to as electronic mail.

The new software allows messages to be created on and transmitted across a variety of computer systems using private and public data communications links, including telephone lines. It is the first commercially available electronic messaging system based on the international standard for computer-based messaging.

The software is being marketed through a licensing agreement between UBC and Sydney Development Corp. of Vancouver. Sales have already been made to such international communications giants as AT&T in the U.S., Siemens in West Germany, British Telecom, the Olivetti Corp. in Italy and to AES Data in Canada.

The software is the creation of Mr. Gerald Neufeld of UBC's computer science department whose research was supported by strategic NSERC grants administered by Dr. Paul Gilmore, former head of the department.

Robotics

Several projects are under way in biomedical and industrial applications of robotics. One example is the first use of a robot in surgery in the world.

The robot is the creation of Dr. James McEwen, adjunct professor in UBC's electrical engineering department and director of the biomedical engineering departments at both the Vancouver General Hospital and the Health Sciences Centre Hospital on campus. Dr. McEwen worked in conjunction with Dr. Brian Day, an orthopedic surgeon in UBC's Faculty of Medicine, and Andronic Devices Ltd. of Vancouver.

The robot assists Dr. Day in knee operations. The first robot-assisted surgery took place one year ago and since then some 80 operations have been carried out.

Another robotics project involves the design and operation of a robot arm that can do such tasks as automated welding, particularly in areas of limited access.

A group led by Dr. Dale Cherchas in UBC's mechanical engineering department is working in assocation with the TRIUMF cyclotron project on UBC's south campus, where welding and other repairs must be carried out in areas of high radioactivity. They are designing computer software so that a PUMA 500 robot arm is automatically programmed to carry out welding operations.

Dr. Peter Lawrence and colleagues in UBC's electrical engineering deparment are applying automated robotic principles to the operation of logging equipment.

Complex machines used in the forest, mining and construction industries have not benefitted from advances made in robotics and remote manipulation that have, for example, become commonplace in the operation of arms of deepsea submersibles or of the Canadarm used in the U.S. space program.

The UBC project would allow operators of forest harvesting equipment such as mechanical grapples to control the machine remotely, using a variety of aids such as voice commands and stereo video cameras.

The project is being carried out in association with MacMillan Bloedel Ltd. and is particularly relevant to logging in the coastal forests of the province where logging costs are high.

Dr. Lawrence is also involved in a research project that would automatically scale logs. At present, log scalers physically measure each log to determine wood volume. Using two video cameras suspended over the log scaling area, a computer-assisted device would automatically read out wood volume. Scalers, however, would still be required to identify the species of wood and wood quality.

Micro-electronics

Central to many of the projects in computer systems is the design of new computer micro-chips, often using new materials such as gallium arsenide which is much superior to silicon now used in commercial chip production.

Much of this research is carried out by Drs. David Pulfrey and Lawrence Young in the electrical engineering department. The chip designed to guide the operations of the automated log scaling machine mentioned above, for example, was created by this group. It is the largest chip ever produced in Canada.

Artificial Intelligence

UBC is a major participant in a national research project in artificial intelligence sponsored by the Canadian Institute for Advanced Research, a privately-funded organization that finances research in the national interest.

Much of the research involves designing a system that can "read" or visually understand a situation, decide what actions should be undertaken on the basis of its understanding, and can then carry out the tasks.

A major focus of the UBC research is to allow for the automatic reading and interpretation of images received from orbiting earth satellites. The project involves a number of UBC units including the computer science and psychology departments and the Faculty of Forestry.

Biotechnology

UBC is as strong in biotechnology as any university in Canada. Its vigor was not developed overnight. The University built its reputation over three decades, beginning at a time when the commercial promises of biotechnology were nebulous and vague.

There is no clear definition of what biotechnology means. The term is sometimes used as a rubric for all techniques to exploit living animal or plant cells. Older methods such as fermentation date back to the beginning of civilization.

Tissue culture -- the growing and sustaining of cells in special nutrient fluids introduced decades ago -- was overtaken in some applications by a variety of new methods that came out of molecular biology in the 1960s, including immunology, recombinant DNA and enzyme technology. Today biotechnology is usually used to refer to these more recently-developed methods.

New techniques for cell manipulation have flourished. Scientists now alter the genetic material within cells with a precision unknown only a few years ago. Some of the fundamental breakthroughs in the technique of gene manipulation occurred at UBC.

Biotechnology is a potential cornucopia with myriad applications promising to bring massive social and industrial changes on a scale equal to the impact of micro-electronics. It is being applied to the diagnosis and treatment of disease, and to agricultural, forestry, waste management, energy and other industries.

A measure of UBC's strength in the area is the fact that biotechnology research takes place in dozens of departments in at least half of the faculties on campus. UBC President David Strangway has appointed an advisory committee on biotechnology consisting of the deans of the Faculties of Agricultural Sciences, Applied Science, Forestry, Medicine and Science.

Major advances in genetics research occurred at UBC in the 1950s under the leadership of Dr. Gobind Khorana who later won a Nobel Prize for solving the genetic code controlling the way genes make cell products. Dr. Khorana is also well known for creating the first man-made gene, the basic hereditary unit.

The University has about 100 research projects in biotechnology under way.

UBC has received 30 per cent of all grants awarded to all Canadian universities under the National Research Council's program for industry-laboratory projects (PILP). And the University has about 25 per cent of all recent strategic grants in biotechnology from the Natural Sciences and Engineering Research Council of Canada (NSERC).

UBC scientists represent the three provincial universities on the advisory committees on biotechnology of the Ministry of State for Science and Technology (MOSST) and the National Research Council (NRC). The MOSST committee reports directly to the cabinet.

In 1982 the University created the Centre for Molecular Genetics, an umbrella organization to pull together a certain category of biotechnology research on campus. Being recruited as director of the centre is Dr. Michael Smith of the biochemistry department in UBC's Faculty of Medicine, regarded by his peers as one of the best geneticists in North

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See EXCELLENCE

April is cherry blossom time at UBC's beautiful Nitobe Japanese Garden. Join the celebrations at Ohanami, the annual Cherry Blossom Festival which takes place on Saturday, April 12 in Nitobe Garden and Asian Centre. For ticket information, call 261-0640.

CAMPUS PEOPLE

Prof. Charles McDowell, former head of UBC's Department of Chemistry, has been elected a member of the European Academy of Arts, Sciences and Humanities. The academy brings together the most eminent scientists, writers and artists in the world. Prof. McDowell headed the chemistry department from 1955 until 1981 during which time it established an international reputation as one of the leading chemistry departments in North America. He continues to be an active researcher in the department. In 1981 he received the special appointment of University Professor in recognition of his contributions to UBC.

UBC graduate **Ann Marantz,** a former financial aid officer and director of alumni records on the campus, has rejoined the administrative staff as assistant registrar, records, in the Registrar's Office.

Ms. Marantz was director of records for UBC's Alumni Association from 1979 to 1985 and a financial aid officer at UBC in 1974 and 1975. Prior to returning to the campus to take up her present position she was a training coordinator at Pacific Press.

Ms. Marantz replaces assistant registrar Trish Angus, who left UBC to take up duties as registrar at Douglas College.

Dr. Axel Meisen, dean of the Faculty of Applied Science, was the 1985 recipient of a Professional Service Award from the Association of Professional Engineers of British Columbia. Dr. Meisen, whose areas of expertise focus on environmental problems related to the chemical, petroleum and natural gas industries, was recognized for his contributions to Canadian engineering, his international consulting activities and for his role in developing engineering programs at universities in Cuba, Peru and the Philippines.

Dr. Vinod Modl, an internationally recognized expert in the field of satellite communications, received the 1985 Meritorious Achievement Award from the association. Dr. Modi's research interests include satellite control systems, aircraft design and biomechanics . In addition to his reputation as a scientist, Dr. Modi is an award-winning photographer. Recently at a one-man exhibit, his photographs raised $32,000 for the National Association for the Blind.

Prof. Norman Young of UBC's theatre department has been re-elected as chairman of the Vancouver Civic Theatres Board, which oversees the operations of the Orpheum and the Queen Elizabeth Theatre and Playhouse.

Friends and colleagues will mark the 60th birthday of **Dr. Gerald Porter,** an honorary professor in the Department of Chemistry, by staging a Physical/Inorganic/Photo- chemistry Symposium in the Faculty Club on April 11 and 12.

Fourteen former students and colleagues will give seven papers on each day of the symposium. Some of the speakers are coming from such widely scattered places as Koln in West Germany and the Universities of Georgia, Pennsylvania and Southern California. A reception and dinner is also planned on Friday, April 12. Detailed information is available by calling 228-3266.

Prof. Porter, a faculty member since 1956, took early retirement several years ago but has continued to do research and carry out administrative duties in the chemistry department.

Dr. Tim Oke of the Department of Geography has been awarded the Canadian Association of Geographers Award for Scholarly Distinction for 1986. Dr. Oke is an expert in the field of climatology.

Dr. Peter Dooling of UBC's Faculty of Forestry recently received the National Parks Centennial Service Award from Parks Canada in recognition of his contributions to the protection of natural landscapes in British Columbia. He also received an Award of Outstanding Recognition from the federal government for his conservation efforts.

Big Block Winners

UBC's athletic communities gathered over the last couple of weeks to recognize the top men's and women's athletes in 1985-86 and to induct new members into Big Block clubs. On March 20, the Bobby Gaul Award as UBC's most outstanding graduating male athlete was presented to Simon Hoogewerf, left, a fourth-year Science student and a member of Canada's 1984 Olympic team who is regarded as this country's premier middle-distance runner. He's led the Thunderbird men's team to four straight Canada West track and field championships. On March 25, Dr. Thelma Cook, right above, who chairs the Women's Athletic Committee, announced that the trophy honoring UBC's top women athletes would not only be shared in 1986 but had undergone a change of name to honor Marilyn Pomfret, left, who retires this year after 23 years as a faculty member in Physical Education and Recreation and 13 years as director of women's athletics. Sharing the Pomfret (formerly the Sparling) Trophy are Barbara McBain, second from left, a member of the women's swimming team, which was named the women's Team of the Year, and Jodie Blaxland, a top UBC field hockey player who is currently a member of Canada's national team.

Universities express concern over 'matching grant' scheme

Canada's university community has expressed concern about an announcement by federal finance minister Michael Wilson that future increases in spending for university research and development will depend on matching grants from the private sector. UBC Reports asked research vice-president Dr. Peter Larkin to comment on Mr. Wilson's proposal.

"The wording of the news release about the scheme implies that UBC would have to approach local industry and encourage them to make contributions to the Natural Sciences and Engineering Research Council. These contributions would be matched by the government and NSERC would place the funds in a pool to be dispensed for industry-related research in general. Industry donors would thus have no guarantee that the funds contributed would support research in their fields of interest.

"I don't believe this system will work very well. There is no real incentive, except perhaps for tax purposes, for local companies to contribute when there is no assurance that the funds will be spent in their areas of interest. And there is no real incentive for the universities to encourage industry contributions when the funds may be put into research at some other institution. If a particular company should give funds to NSERC, then the universities will be told when they ask for funds, 'Sorry, but we gave to NSERC.'

"What I've said above may be based on a misunderstanding of how the granting agencies intend to proceed in acquiring and disposing of funds from industry. If so, the university reasearch community will be considerably relieved.

"I suggest NSERC follow along the lines that presently apply in university-industry grants, matching the external contributions for particular projects that are presented by universities that have approached industry for support or vice versa."

Correction

Our apologies ... In our last issue we ran a photograph of Haida artist Robert Davidson's sculpture Raven Bringing Light to the World with a caption describing the work as a bronze sculpture. The 200-kilogram sculpture, which measures 1.2 metres in diameter, is gilded bronze.

Music department redesignated

UBC's Department of Music will become the School of Music next month if UBC's Board of Governors confirms a recommendation approved by Senate at its March 19 meeting.

A recommendation to change the departmental designation to that of a school was made by the Faculty of Arts, whose dean, Dr. Robert Will, told Senate that music met the five criteria approved by Senate in 1949 for designation of academic units as schools.

These include courses which are "mainly professional or vocational in character"; "a specialized curriculum leading to a distinctive degree"; and "a relationship with outside professional bodies...because of professional requirements which must be considered in designing the curriculum."

UBC, Dean Will told Senate, "has one of the major campus-based music programs in Canada."

Do universities give women a fair deal?

"We're still behind in attracting really top females to academic professions. Obtaining an advanced scholarship degree means many years of study for a university salary which is often less than that available through other professional career paths. A lot of females don't want this life." These comments by Dr. Larry Moore, director of the Faculty of Commerce and Business Administration's Ph.D. and M.Sc. programs, reflect a growing concern about equal opportunities for women at universities and colleges in North America.

The commerce faculty's graduate program, the largest in Canada, attracts the top five percent of Canadian academics in its area. Last year, a special Outreach Fellowship was established to attract female candidates to the Ph.D. programs at UBC and the University of Alberta. Valued at $12,000 a year, the fellowship is renewable for an additional two years. But even though many of the faculty's top students are women, the doctoral program is having difficulty finding qualified women who are interested in applying for the scholarship.

It's not only Prof. Moore who is pondering the question of why qualified women are not considering an academic career. Prof. Carolyn Attridge, chairperson of the Canadian Association of University Teachers' Status of Women Committee recently addressed the UBC Academic Women's Association on the future of women academics. She cited the shortage of women at a graduate level as a major reason universities are failing to attract more women to faculty positions.

Like Dr. Moore, she concluded that many qualified females are not interested in pursuing an academic career, but she came up with different reasons. She assigned part of the problem to "systemic discrimination", a term coined by Toronto Judge Rosie Abella. The term refers to discrimination that is built into the system. "For example, standards for promotion and tenure cause women to be penalized for taking time out for child-rearing or for the gaps in their career path when they follow their husband when he is transferred," she said. She also pointed out that across Canada, women academics are paid less than men.

Drop out points

Women usually drop out of the academic system at two points. The first point appears to be after their Master's degree. In the 1985-86 session at UBC 47 per cent of all students in Master's programs are women. But only 28 per cent of all doctoral students are women. Dr. Nadine Wilson, president of the Academic Women's Association at UBC suggests the next drop off point is right after the Ph.D. "Between the completion of their Ph.D. and their first academic job, there is a vanishing point. Competition is so severe for jobs now, some of them just give up. Lynn Smith, one of three women professors in the Faculty of Law suggests that this vanishing point could indicate that women are taking time off to have families, but it also could indicate discrimination.

In Canadian universities, women hold only 16 per cent of the faculty positions. At UBC, the situation is slightly brighter with women holding 19 per cent of faculty positions. In the past decade, the proportion of female faculty has increased only four per cent, during a period which has seen unprecedented numbers of women entering professional fields like law, dentistry and medicine, which were previously dominated by men. Forty-six per cent of this year's first year law class, for example, are women.

Action taken

What are Canadian universities doing to improve the status of women academics? A few of them have begun to take action. "The University of Western Ontario has developed a special policy in order to redress their percentage of women faculty, which is lower than the national average," said Prof. Attridge, who is director of the University of Victoria's School of Nursing.

The Canadian Association of University Teachers has adopted a positive action policy to increase the number of women on the faculties of Canadian universities. The association's efforts are directed at the appointment level. Model policies are being written to address such issues as parental leave.

The association is also currently revamping a model appointment, promotion and tenure document. "The aim is to produce a document to create a reference point which reflects the career pattern typical of most women," said Prof. Attridge.

An attempt will be made to remove some of the procedures that discriminate against women in university policy documents. As well, a regular column in CAUT Bulletin will keep women's issues before the academic community.

Although concerned about salary inequities between male and female faculty members, two high-ranking UBC women academics questioned by UBC Reports expressed reservations about the development of a model policy which could cause a woman's file to be looking at in a different manner than a man's. Prof. Anne B. Piternick, Associate Dean of Arts said, "It's difficult to see exactly what kind of policy you could make up in these circumstances. Whatever the situation is, you're going to have some kind of academic or service qualification."

Dr. Martha Salcudean, professor and head of the Department of Mechanical Engineeering, was wary of special programs for hiring women and felt such a method could really backfire. "Somehow you want to feel that you've been hired on your own strengths and ability."

Reports issued

Three reports have explored issues related to the status of women academics on the campus in the last 12 years. In 1972, the UBC Women's Action group sponsored "A Report on the Status of Women at the University of British Columbia." Two years later, a joint administration and Faculty Association committee, chaired by Dr. George M. Volkoff, was created to advise the President on procedures for a review of salary inequities between male and female faculty.

A third committee established in 1975 used the "matched peer" technique to identify salary discrepancies between male and female faculty. The result of their exploration was that an average salary increase of $1,900 was awarded to 29 female faculty members of 109 surveyed. In its recommendations, the committee called for a review of salaries of faculty members in the Schools of Nursing and Rehabilitation Medicine, and of all part-time faculty and senior instructors. These groups were not included in the "matched peer" review. "Nineteen hundred dollars a year may not seem like much money," observed one woman faculty member regarding the situation, "but it's a question of the regard in which your work is held."

Another report, "Academic Women at the University of British Columbia 1972-1982" was submitted to the executive of the Faculty Association by an ad hoc committee composed of three men and three women, chaired by Maureen Murphy of the School of Nursing.

The committee discovered that the status of women has improved over the last 10 years, but that in several areas, progress has lagged. The findings included:

- Approximately 50 per cent of women do not have tenure;
- The majority of women (73 per cent) are in ranks below associate professor whereas a minority of male faculty (26 per cent) are in these ranks;
- On the average, women who are promoted take approximately one year (15 per cent) longer to be promoted than men;
- In the last ten years, the salary differential has generally decreased but when salaries of female faculty are compared with those of male faculty, considering education, age, faculty, department and rank, a male faculty member earns on the average 4.5 per cent or approximately $2,000 more than a female faculty member;
- Few women are in senior administrative positions;
- Data collected indicates that, in the university overall, women were promoted less frequently than men.

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America. He was recently elected a Fellow of the Royal Society of London in recognition of his outstanding research contributions.

Dr. Smith and his research team developed a method to modify specific genes on cell chromosomes.

Prior to Dr. Smith's work, scientists analysed genes by random mutations and searched thousands of random samples until a desired change finally turned up.

UBC's ability in biotechnology has already attracted a $35-million Biomedical Research Centre for the production and clinical assessment of therapeutic cell products which regulate the body's ability to fight disease. Also involved in the centre is the Wellcome Foundation of the U.K. and the Terry Fox Medical Research Foundation.

Space does not allow the listing of all the biotechnology research projects being carried out at UBC. To give some idea of the diversity of activity, here is an outline of a few projects.

Fermentation

Biotechnologists use term fermentation not only to describe the method used to produce beer, wine and cheese but to cover all modern biotechnological techniques of growing cell products. A problem common to most such techniques is that it is difficult to know what is going on at any time. The cell growing methods are hard to control because of present primitive methods used to measure the rate of production.

UBC's microbiology and chemical engineering departments are combining their research resources to develop quicker and more exact methods of measuring and controlling biotechnical production rates. This new area of bio-reactor design is essential if the fruits of biotechnology are to be realized.

Agricultural Biotechnology

Dr. Brian Holl of UBC's plant science department in the Faculty of Agricultural Sciences is carrying out research to decrease the agricultural industry's dependence on chemical fertilizers. Nitrogen is a basic ingredient of chemical fertilizers and he is trying to exploit the ability of plants and soil bacteria to convert nitrogen in the atmosphere to nitrogen that would be available to plants for growth.

It is well known that the legume species of plants -- peas, clover, alfalfa and others -- have the ability to "fix" or convert atmospheric nitrogen in nodules in their roots. The nitrogen can then be used by the plants for growth. Or once the plants are harvested, the nitrogen enriches the soil for future crops.

A legume hemoglobin similar to the familiar blood hemoglobin, along with bacterial and plant enzymes, is involved in the chemical process that converts nitrogen into a usable form. Another important function of the leghemoglobin is to provide the root nodules with oxygen for respiration and for producing energy.

Part of Dr. Holl's research is to determine the balance between the leghemoglobin's nitrogen fixing and respiration functions so that nitrogen fixation can be maximized.

He is also working on another group of little understood soil bacteria that have the ability to fix nitrogen in the soil without being associated with plants such as the legumes.

The end goal of this project would be to coat the seed of plants such as wheat with the bacteria, so that nitrogen would be fixed in the soil where such crops are grown.

"If we succeed in inoculating wheat seed with the bacteria, the increased nitrogen in the soil of Canadian wheat fields would be the equivalent of $3 million of chemical fertilizer," Dr. Holl said.

Waste Management

An increasing amount of biotechnical research is taking place in UBC's Faculty of Applied Science. Research on the microbiological conversion of sewage has been under way for some years in the civil engineering and bio-resource engineering departments as well as the agricultural mechanics department of UBC's Faculty of Agicultural Sciences.

In the chemical engineering department, a major thrust has been to apply biotechnology to the removal by leaching of heavy metals from ore concentrates. The process would replace current smelting methods, many of which are environmentally damaging.

The use of micro-organisms to remove metals from ore concentrates is the subject of millions of dollars of research around the world and could revolutionize some aspects of the mining industry.

A research team in the department, working with B.C. Research, the private research organization on campus, has developed a laboratory method for the microbiological leaching of copper and zinc. The next step in their research is to scale up the process so that it can efficiently operate continuously with commercial volumes of concentrate.

A variety of biotechnology research is taking place at UBC's Terry Fox Laboratory, part of the B.C. Cancer Research Centre. Teams of researchers are applying genetic engineering and other biotechnology techniques to study the cancers of the lymph system and of blood, such as leukemia.

They have developed monoclonal antibodies for both leukemia and lymphoma, a type of cancer of the lymph system. Monoclonal antibodies preferentially attach themselves to cancer cells and provide definitive evidence of the presence of the diseases. In addition to confirming the disease -- early diagnosis of cancer is essential for successful treatment -- monoclonal antibodies are promising tools for treatment. Researchers can bind the monoclonal antibodies with a compound that will kill the cancer cells. The combined monoclonal antibody and killer compound -- known as a "magic bullet" among cancer researchers -- searches the body for the cancer cells and attaches itself to them, allowing the anti-cancer drug to destroy the malignant cells.

The lab is also heavily involved in B.C.'s bone marrow transplant program, the only one in Western Canada. Cancer patients receive large doses of radiation and anti-cancer drugs to destroy all bone marrow cells. Then bone marrow cells from a close relative -- to reduce the chances of rejection -- are transplanted into the patient so that production of normal blood cells can resume. Approximately 100 such transplants have been carried out in Vancouver.

A variation is to "transplant" back into a patient some of their own bone marrow cells that have been treated to remove all cancer cells. The transplanted cells are removed before the bone marrow system is destroyed through radiation and chemotherapy. This new method of bone marrow transplantation has significant advantages because it reduces the possibility of rejection by the body of foreign cells and because some patients do not have close relatives who could act as donors.

UBC Calendar

Calendar Deadlines

For events in the period April 20 to May 3, notices must be submitted on proper Calendar forms no later than 4 p.m. on Thursday, April 10 to the Community Relations Office, 6328 Memorial Road, Room 207, Old Administration Building. For more information, call 228-3131.

MONDAY, APRIL 7

Botany Seminar.

Variation and Species Discrimination in a Toxic Red Tide Dinoflagellate. Allan Cembella, Botany, UBC. Room 3219, Biological Science Building. 12:30 p.m.

Economics Seminar.

The Imminent Failure Hypothesis in Canadian Banking. John Chant, Simon Fraser University. Room 351, Brock Hall. 4 p.m.

Biomembranes Discussion Group/Biochemistry Seminar.

Factors Affecting Phosphoinositide Breakdown During Signal Transduction in the Platelet. Richard J. Haslam, Pathology, McMaster University. IRC 4. 4 p.m.

Zoology "Physiology Group" Seminar.

New Insights into Lactate Metabolism in Mammals. Dr. R. Cornett, Physiology, University of Rochester. Room 2449, Biological Science Building. 4:30 p.m.

TUESDAY, APRIL 8

Computer Science Colloquium.

Permutation Graph Decomposition. Lorna K. Stewart, Computer Science, University of Toronto. Room 301, Computer Sciences Building. 10:30 a.m.

Botany Seminar.

Ultrastructural Contributions to Red Algal Systematics. Dr. Joe Scott, Biology, College of William and Mary. Room 3219, Biological Science Building. 12:30 p.m.

WEDNESDAY, APRIL 9

Pharmacology & Therapeutics Seminar.

Nutritional Effects on Brain Biochemistry, Learning and Behavior. Dr. Shlomo Yehuda, Psychopharmacology, Bar-Ilan University, Israel. Room 317, Basic Medical Sciences Building, Block C. 12 noon.

THURSDAY, APRIL 10

Anthropology and Sociology Seminar.

Changing Responses to Death in Contemporary Brittany. Dr. Ellen Badone, Visiting Scholar, University of California, Berkeley. Room 207-209, Anthropology and Sociology Building. 12:30 p.m.

Environmetrics Seminar.

Precipitation Chemistry and its Influence on Streamwater Chemistry Near Vancouver, B.C. Dr. M. Feller, Forestry, UBC. Room 225, Mathematics Building. 3:30 p.m.

Economics Seminar.

The Profitability of Interruptable Supply. Terry Lewis, UBC. Room 351, Brock Hall. 4 p.m.

Biochemical Discussion Group.

Conformational Transitions in Glyogen Phoshorylase. Dr. Steve Strang, Biochemistry and Biophysics, University of California, San Francisco. IRC 3. 4 p.m.

FRIDAY, APRIL 11

Medical Genetics Seminar.

Hemifacial and Bilateral Facial Defects Caused by the Mouse Mutation, First Arch or What Happens When Recessives are Dominant. Dr. Muriel Harris, Medical Genetics, UBC. Parentcraft Room, Grace Hospital. 1 p.m.

Chemistry Symposium.

Physical/Inorganic/Photochemistry Symposium to mark the 60th birthday of Dr. Gerald Porter, Department of Chemistry. A total of 14 papers will be given by colleagues and former students at two sessions: Today from 2:30 p.m. to 5 p.m. in Room 225 of the Chemistry Building and tomorrow (Saturday) from 10 a.m. to 12:30 p.m. in the Music Room of the Faculty Club. Reception and dinner Friday from 5:30 p.m. to 10 p.m. in the Faculty Club. For details, call 228-3266.

MONDAY, APRIL 14

Cancer Research Seminar.

Clinical Applications of DNA Analysis. Dr. Jean C. LeRiche, Laboratory Medicine, CCABC, and UBC. Lecture Theatre, B.C. Cancer Research Centre, 601 W. 10th Ave. 12 noon.

WEDNESDAY, APRIL 16

Pharmacology and Therapeutics Seminar.

Pharmacological Interventions in Myocardial Ischaemic Injury. Dr. D.V. Godin, Pharmacology and Therapeutics, Medicine, UBC. Room 317, Basic Medical Sciences Building, Block C. 12 noon.

Pharmaceutical Sciences Seminar.

Kinetics and Fetal Effects of Metoclopramide. Wayne Riggs, Pharmaceutical Sciences, UBC. Room 202, The Research Centre, 950 W. 28th Ave. 12 noon.

THURSDAY, APRIL 17

Psychiatry Lecture.

A Review of Tardive Dyskinesia. Dr. Daniel E. Casey, Psychiatry, Oregon Health Sciences University. Lecture Theatre, Health Sciences Centre Psychiatric Unit. 9 a.m.

Chemistry Seminar.

An Approach to the Synthesis of Yeast Alanine Transfer RNA. Prof. Colin B. Reese, Kings College, London, England. Room 250, Chemistry Building. 1 p.m.

FRIDAY, APRIL 18

Medical Genetics Seminar.

The Structure of Chromosome Ends. Dr. Linda Button, Medical Genetics, UBC. Parentcraft Room, Grace Hospital. 1 p.m.

Notices . . .

Golf Tournament.

The 30th Annual Faculty and Staff Golf Tournament will be held on Thursday, April 24th. Golf competition to be played at the University Golf Course (fees $15) and dinner in the Faculty Club (full buffet $19). Application with Tournament details available at the Faculty Club Reception Desk. Open to all active and retired members of faculty and staff -- both men and women.

UBC Advisor and Admission Night.

Students who want to attend UBC on a part-time basis will receive counselling about admission requirements, registration procedures, and career planning, as well as information on all UBC general services useful to evening part-time students at the Advisors' and Admission Night to be held April 3, 6-8 p.m., in the lounge area of International House. Use Gate 4, off Northwest Marine Drive, to the parkade.
Students new to UBC must bring all secondary and post-secondary school transcripts if they want to apply to the University at this time. Returning students will be able to register then and there. Students who wish to transfer to UBC and/or Summer Sessions will benefit from this gathering of faculty advisors.

50th Anniversary.

The Centre for Continuing Education will celebrate the 50th anniversary of the centre's establishment at UBC on Sunday, April 27 at 3 p.m. in the Recital Hall of the Music Building. Program includes readings and a musical recital. Refreshments.

ARC Undergraduate Magazine.

The new Spring/Summer '86 issue of ARC is now available for only $1.50 in the UBC Bookstore (poetry section), Creative Writing Department, and English Department, Buto 397. Become a part of the campus literary scene and submit your short stories, essays, poetry, plays and artwork (even cover design) in your ARC letterbox, Buto 397, for the Fall/winter issue.

Garden Hours.

Nitobe Memorial Garden and the Botanical Garden are open daily from 10 a.m. to 6 p.m. for the month of March and 10 a.m. to 7 p.m. for the month of April. Please call 228-4208 for any further information.

Woodward Exhibits.

Students in the History of Medicine have recently mounted new displays in the Woodward Biomedical Library foyer. Topics include Patient Medicine, Amputation, the Light Microscope, Childbirth, and Ayurvedic Medicine. For more information, call 228-4447.

Language Programs.

Non-credit conversational programs in Japanese, Chinese, French and Spanish begin the week of April 21. For more information, contact Language Programs and Services, Centre for Continuing Education, at 222-5227.

FIRST CLASS MAIL

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