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ingenuity

Faculty of Applied Science
Engineering News

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Engineering the wonders of biology

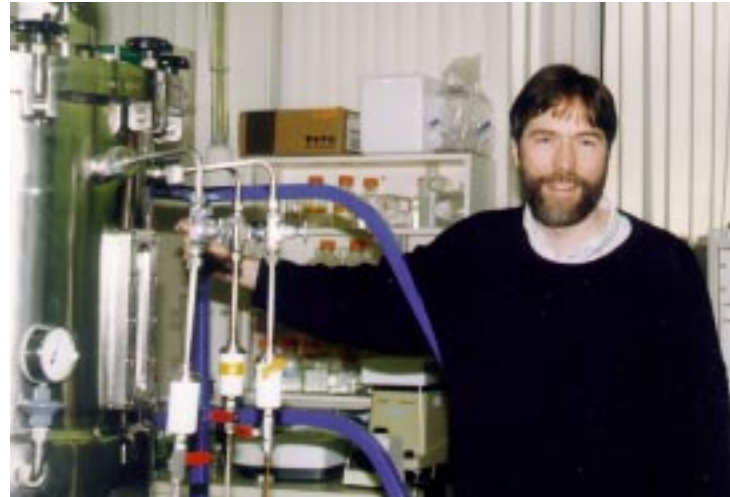
Dr. Jamie Piret combines chemical engineering with biology for amazing results

Fascination with the wonders of biology, combined with a pleasure in making things work, inspired Associate Professor Jamie Piret, a member of the Department of Chemical and Bio-Resource Engineering and the Biotechnology Laboratory, to pursue the field of biochemical and biomedical engineering.

Dr. Piret's work is part of the growing field of biotechnology, where specifically, he is focussed on developing new ways to make biological systems more useful, particularly for medical applications. For example, in one area of his research Dr. Piret works with mammalian cell cultures to produce a therapeutic protein that clears clots from the blood stream of heart attack and stroke patients. "This type of research involves multi-disciplinary teams of chemical engineers, biochemists and medical researchers," said Dr. Piret. "Together, we are involved in developing and optimizing innovative ways to produce mammalian cells."

In another field of research, Dr. Piret's group is trying to answer the frequent call for bone marrow donations for cancer patients. Working in collaboration with Dr. Connie Eaves of the Terry Fox Laboratory and StemCell Technologies in Vancouver, Dr. Piret is developing innovative methods for cultivating hematopoietic cells, which are the active ingredients in bone marrow transplantations. Our bodies require these cells to sustain daily production of hundreds of billions of blood cells.

The ability to cultivate hematopoietic cells is valuable in many clinical applications and Dr. Piret used the example of cancer patients undergoing chemotherapy. "Normally, the treatment to kill growing cancer cells must be limited to avoid killing off the patient's growing bone marrow cells as well. What's needed is a way to protect the blood-forming cells so the cancer cells can be more aggressively eliminated,"



Dr. Jamie Piret shows off a bioreactor used in mammalian cell research

he explained. "Technologies have been developed that allow us to maintain hematopoietic cells outside the patient's body, out of harm's way, during the chemotherapy. However, to increase the availability of hematopoietic cells, the real trick and the focus of our research, is to figure out ways to coax the cells to multiply to larger numbers while maintaining their blood cell producing characteristics."

Adding to the complexity of applied research in biotechnology is the need to learn about other, entirely new technologies. For example, in helping a local company develop a novel acoustic cell separation device, Dr. Piret's group expanded its knowledge of acoustic physics. This now-patented device uses sound waves to keep mammalian cells within a bioreactor, while removing spent medium and protein products, such as the clot-busting protein mentioned

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Message from the Dean

The last few months have seen a number of changes at UBC. The University's new vision document *Trek2000* was finalized, and, as a complement to this, the Faculty's Strategic Plan for Engineering was approved last November. We are now participating with the University in the development of its Academic Plan, which is expected to have a significant impact on the Faculty's development.

Off campus, we are witnessing significant changes in the practice of engineering itself, including the impact of the knowledge explosion, increased competition, globalization, technological advancement, environmental awareness, and demands for infrastructure renewal. Associated with these changes is a growing demand for engineers who have a solid grounding in engineering fundamentals, and are at the same time flexible and articulate, and have complementary skills relating to teamwork, leadership, management and strategic thinking.

This need for engineers with complementary skills, and particularly business skills, is a message we have heard often. As a partial response to this, I am pleased to announce that we have recently introduced a Minor in Commerce in all engineering programs. We discuss the Minor in greater detail within this issue.

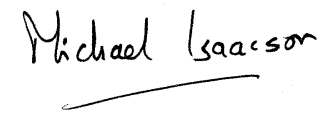
The improvements we are instituting extend not just to education and the preparation of an increasingly skilled workforce, but to research as well. More than ever, Faculty research is providing direct benefits to the BC economy in new and innovative ways. Some of these include: the creation of spin-off companies, new products and concepts licensed to existing companies, creative and cost-saving methods for tackling persistent industry challenges, and major contributions designed to address significant societal issues such as efficient resource development, environmental protection, and the mitigation of natural hazards.

In all areas of the Faculty, we are making a concerted effort to create linkages and participate in outreach with members of industry, government and our surrounding community. A notable success thus far has been the establishment of the Engineering Advisory Council. This issue of *Ingenuity* highlights some of the members of the Council and you will have a chance to "meet" the remaining members in our next issue. We consider ourselves fortunate to work with such a supportive group of people who are proving to be of immense benefit in shaping the future directions of our Faculty.

Of course, we continue to face a number of challenges, leading us to rely increasingly on development activities to ensure the excellence of our education and research. We have recently appointed two new Faculty Development Officers who will engage the Faculty in fundraising initiatives in support of a number of vital projects. Through all these changes, the Faculty outlook is positive and we are committed to meeting to the needs of business and society in British Columbia and Canada.

I would like to thank all Applied Science faculty members and staff for their very considerable contributions to the development of the Faculty; and as well, our many alumni, friends and partners outside the university for their demonstrated support.

Please contact me—by letter, telephone (604) 822-6412, fax (604) 822-7006, or e-mail dean@apsc.ubc.ca—if you would like further information on the Faculty's activities, if you can assist in the development of the Faculty, or if you have any suggestions to provide.



Michael Isaacson, DEAN



Liberal leader gains insight on engineering

In January, Dean Isaacson and members of the Faculty of Applied Science were honoured with a visit from Liberal Opposition Leader Mr. Gordon Campbell and members of the Liberal Caucus. Making the most of the opportunity, Dean Isaacson gave a brief

presentation on the activities of the Faculty of Applied Science, the importance of engineering to the BC economy and to society, and the role that the Faculty is playing in meeting human resource needs and contributing to economic growth.

In the general discussion that followed, issues raised included the wide range of economic sectors that benefit from UBC engineering, and the significance of

the Faculty's extensive interactions with industry. Of primary concern was a discussion surrounding the critical need to work towards meeting the high demands from industry for more engineering graduates and, similarly, meeting the demands from students for greater access to our engineering programs.

Throughout the exchange, the Dean emphasized progress being made in community and

industry outreach through activities such as co-op education, professional partnerships, research collaborations, and technology transfer.

The Dean issued an open invitation to those present for a more complete visit to tour the Faculty's facilities and to hear from faculty and students, thereby providing a more complete picture of the important work in Applied Science.

Reaching out to industry

Dr. Malcolm Scoble primes the next generation of mining professionals

Backed by a firm belief that the future of his profession lies in industry outreach, Mining and Mineral Process Engineering Department Head, Malcolm Scoble, is taking action to connect UBC students with industry leaders and alumni.

"I think it's important for a department head to have an external vision and to build strong external relationships," emphasized Dr. Scoble. "In our case, I want these relationships to include our students and the people who work in the mineral resource industries."

Dr. Scoble has involved students in his vision by encouraging membership and active participation with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) and the Mining Association of British Columbia (MABC). "Every month, the local branch of CIM holds a luncheon. Last fall, I attended a meeting with our second year class. The Chairman called for the introduction of any guests and it made quite an impression when about 60 of our students stood up en masse," said Dr. Scoble with a smile. "Things like that show industry that we have a group of young professionals who are eager to participate in the mining community."

Because he sees industry and community interaction as an intensifying trend, Dr. Scoble is working hard to establish solid partnerships through multiple points of contact including: securing adequate student employment through promotion of the co-op program; facilitating the creation of scholarships and research chairs; seeking out active industry representatives for Adjunct Professorships; establishing timely continuing education offerings for industry partners; and reshaping the department curriculum based on the changing needs of the industry.

The last of these issues, reshaping the curriculum, is proving to be the biggest challenge. "The mining industry is going through significant change," noted Dr. Scoble. "That means the skill sets of our graduates must change accordingly."

"Placer Dome is a great example. This is a prominent BC-based gold mining company that has told us its future lies in international mining operations. New technology is becoming increasingly important, and so too are commitments to sustainable development. This means that graduates must have not only technical strength, but also strong social values, linguistic skills and cultural awareness. As a department, we currently are going through the process of determining how these industry needs will affect the way we teach and prepare students."



Dr. Scoble is addressing industry needs not just through his role as department head, but through his own research as well. Throughout his career, which has included prominent positions with Nottingham University in England, and McGill University in Quebec, Dr. Scoble's research interests have evolved from safety and mine design, to competitiveness and mine automation.

Currently, he is working to help mines develop new technologies. For example, one of his graduate students has been working with the Highland Valley Copper mine, near Kamloops, BC, in machine monitoring and Global Positioning Satellite (GPS) technology. This gives mines the ability to pinpoint the exact location of heavy equipment, particularly drills. "What we're doing is taking the guess-work out of drilling," Malcolm explained. "The intelligent

drill can sense the hardness of the rock it is penetrating, while the GPS technology gives it the capability to know exactly where it is in relation to where it is supposed to be. This type of technology creates opportunities for remote control and development of intelligent mining machines, which eventually will be robotic. Most important, this technology will help mines remain competitive by bringing down the costs of mineral production."

Whether through new technology, teaching, or industry advocacy, Dr. Scoble is focused on creating strong, working partnerships that will benefit both the current and the next generation of mining and mineral process engineers. Backed by a department of talented professionals and a receptive industry audience, it looks like he'll succeed.

Faculty answers industry call for a Commerce Minor

Industry asked and we responded—with a brand new Minor in Commerce set to commence this September.

“For some time now, our industry partners have been telling us that, while our engineering students have great technical skills, what they need are more business skills,” explained Dr. Bruce Dunwoody, Associate Dean, Engineering Student Services. “When you think about it, this makes a lot of sense. The time that an industry-employed engineer spends on actual engineering is usually about 10 years. The rest of his or her career is often spent in business or management. To be successful in the long term, UBC engineers need strong business skills. That’s what the Commerce Minor will provide.

“Traditionally, minors associated with engineering are available as options within individual engineering programs,” said Dr. Dunwoody. “In this case, we sensed that the Commerce Minor would fill a Faculty-wide need so we will launch it as our

first Faculty minor. This means that it will be available to all engineering students.”

The new minor will consist of six courses, including Engineering Economics, Economics 100 or 309, and nine credits of commerce courses, including Marketing. Students who plan ahead with their elective choices should be able to complete the minor without adding much time to their regular undergraduate program. As an added benefit, Dr. Ted Heidrick, Director of the Advanced Technology Management Program, said that these courses will “provide a good foundation for engineers who may want to continue on to more advanced technical or management degrees.”

UBC Director of Engineering Co-op, Ms. Kelly Meechan, was ecstatic to learn about the Commerce Minor. “I’m hearing a tremendous demand for our co-op students to supplement their engineering education with business skills. Employers are telling students that in order to be a really good engineer, they need to have a general understanding of business issues and how decisions are made at all levels of an organization. I’m confident that students who take advantage of this new minor will have far greater opportunities upon graduation.”

Mining memories begin at UBC



Engineering Alumnus **Sandy Laird**, concluded a successful career with Placer Dome Inc. in February 1999.

Placer Dome Executive Sandy Laird looks back on the real lessons learned

He lived in campus housing that consisted of plywood shacks and army tents, but as far as Sandy Laird, P. Eng., is concerned, those were some of the best years of his life—years that effectively shaped the rest of his long and successful career in mining and exploration.

This 1957 graduate of UBC’s Mining Engineering program recently retired from his position as Executive Vice-President of Placer Dome Inc., one of the largest gold mining companies in the world. Throughout a career that has spanned more than four decades, Mr. Laird has been involved in the con-

struction and operation of all but one of Placer’s many worldwide mining operations. He lived and worked in the jungles of Papua New Guinea and made friends with the natives of Indonesia. He credits much of his good fortune to the lessons learned right here at UBC.

“At the time I was studying at UBC, I thought I was learning about chemistry, physics and calculus,” reflected Mr. Laird. “Looking back now, I see that what I really learned was a way to think, how to work hard and discipline myself, how to make decisions and set priorities, and how to get the most out of other people by

listening to their opinions. These are the skills that got me where I am today.

“The actual formulas I learned and the exams I wrote, well, a lot of that never reappeared after graduation. In other words, it’s not what I learned but how I learned it that counts.”

Mr. Laird remembers the UBC campus as a tight-knit community where students and professors built up lasting personal relationships. In fact, he looks upon his professors as the mentors who helped shape not just his education, but his personality and attitudes as well.

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Habla Español?

Co-op students Julie Gubbins and Sariah Tambre experience six months in Peru

Talk about culture shock. When Sariah Tambre and Julie Gubbins arrived in Peru’s Lima Airport at 4:00 am last summer, the only thing they could count on was each other. Despite several months in Spanish 100, these two fourth-year Civil Engineering Co-op students weren’t overly confident about their surroundings.

“When we got to Peru, we could speak Spanish really slowly, but we couldn’t understand anything,” recalled Sariah. That would soon change in their almost exclusively Spanish-speaking work environment in the small town of Piura, in northern Peru.

Julie and Sariah accepted six-month assignments with the Universidad de Piura (U. de P.) as part of the Piura IV C.I.D.A. (Canadian International Development Agency) Project, a program organized by former Dean of Applied Science, Dr. Axel Meisen. The intent of the program is to establish a co-op program at U. de P. similar to that at UBC. Julie and Sariah are the fourth and fifth students to participate.

While both women were employed by the University as Assistant Engineers, they tackled slightly different assignments with their respective

supervisors. Julie’s work term involved travelling the Pan American Highway, documenting and photographing damage to road surfaces and bridges in the wake of El Nino’s devastating effects. “Eventually I helped to compile a report summarizing all the damage and providing recommendations to help prevent similar destruction when the next El Nino comes along.”

Sariah, on the other hand, spent her time with the Department of Hydraulics and Hydrology, performing structural calculations for the rebuilding of destroyed bridges. She found this work interesting, but at the same time frustrating. “Since leaving Peru, I have heard that they haven’t started reconstruction and that they might not start for a long time. It’s frustrating to see that the work isn’t going ahead, but you have to realize that there are other priorities, like repairing sewers and securing a supply of potable water. It’s just a very different situation compared to what would happen if a bridge were washed out in Canada.”

As representative Canadian engineering students, both women felt that they made significant contributions as far as encouraging the University to establish its own co-op program. “I think we helped them see



sariah tambre and julie gubbins spent their weekends hiking the remote trails of Macchu Picchu in Peru.

the potential of co-op and the value in providing similar opportunities for their own students,” said Julie. Sariah would have liked to have done more, but she said her employers seemed really impressed with her computer skills, which she put to good use by teaching some of her co-workers to operate valuable, English-only computer programs.

In offering advice to other students considering overseas co-op placements, both women emphasized savoring the cultural experience and approaching the work term with an open mind.

“Think of your overseas co-op term as a once in a lifetime opportunity, even if things don’t go as expected,” Julie advised. “The best part about my work term in Peru was having the chance to experience a completely different lifestyle and to observe how other people live. That’s something that will have a lasting effect on your outlook even after you return to Canada.”



Engineering Advisory Council

Meet the members making a difference

Since its inception in March 1998, the Engineering Advisory Council has provided invaluable input into the direction and planning of future Faculty activities. For example, the Council provided advice regarding the development of the Faculty's Strategic Plan and based on Council discussion last Fall, the Faculty is beginning to address the industry need for engineers with complementary skills in business and management. The input of these Council members will ensure that our Faculty remains at the forefront of engineering education and research. In order to recognize the contributions of the members, who come to us from all facets of industry and government, we present here brief information on who they are and where they come from. Currently the Council has 19 members. We will feature the remaining profiles in the Fall 1999 issue of *Ingenuity*, but our thanks go out to all!

Gordon Bacon is Vice President of Technology and Engineering with Inco Ltd. Prior to joining Inco, he worked with Sherritt Gordon and was a Founder of a Vancouver-based consulting engineering company, Bacon Donaldson and Associates Ltd.

Stanley Cowdell is Founder and President of Westmar Consultants Inc., where he oversees the development of major integrated marine and industrial projects worldwide. He is Past President of the Consulting Engineers of British Columbia.

Stuart Culbertson is Deputy Minister for Science & Technology and Chief Information Officer with the Information, Science & Technology Agency of the Government of British Columbia. During his career, Mr. Culbertson has held numerous ministry appointments relating to Agriculture, Fisheries & Food, International Business & Immigration, and Economic Development.

Douglas Fraser is Vice-President of Sustainable Development with Placer Dome Inc. He joined Placer Dome in 1977 and has held various executive and mine management positions with Placer's worldwide mining operations in Canada and abroad, including President of Placer Dome Canada from 1993 to 1997.

Dan Gelbart is President of Creo Products Inc., a Canadian technology company headquartered in Burnaby, BC. Creo is a leading supplier of business solutions to the printing industry, using its strengths in electronics, optics, precision mechanics and software. Prior to starting Creo, Mr. Gelbart was involved with two other successful BC start-ups: MDI—Motorola and Cymbolic Sciences.

Kevin Huscroft is the Founder, Chief Technical Officer and Vice President, Research & Development for PMC—Sierra, a leading provider of high speed internetworking component solutions located in Burnaby, BC. He has held previous positions with MPR Teltech and BNR.

Chris Nelson is Assistant Deputy Minister, BC Trade and Investment Office, within the Provincial Ministry of Employment and Investment. His responsibilities include strengthening and diversifying the provincial economic base, facilitating international and domestic private sector investment, and enhancing the export of BC's goods and services.

Dr. Jim Reichert is President of the Science Council of British Columbia, a provincial crown agency focused on encouraging economic development through innovative applications of science and technology. He has held previous executive positions with Manitoba's Economic Innovation and Technology Council, the Manitoba Research Council, and the Industrial Technology Branch in Manitoba's Industry Trade and Technology Department.

Dr. Claudine Simson is Vice-President, Global External Research & Intellectual Property at Nortel Technology. She is Chair of the Microelectronics Network of Excellence; a member of the Executive Committee of the National Research Council of Canada; and Vice Chair of the Fields Institute for Research in Mathematical Sciences.

Colin Watson is President and Chief Executive Officer of Spar Aerospace Limited, based in Toronto, Ontario. He has held previous executive positions with companies such as Brascan Ltd., Triarch, Canadian Venture Capital and Metro Cable TV. Mr. Watson serves on a number of corporate and charitable boards.

Achievements

- **Chemical Engineering Honorary Professor and UBC Pulp and Paper Centre Director Richard Kerekes** received the John S. Bates Gold Medal from the Pulp and Paper Technical Association of Canada. This award is the highest technical award bestowed by the PAPTAC.
- **Civil Engineering Associate Professor Perry Adebar** won the 1998 American Concrete Institute (ACI) Structural Research Award in recognition of his co-authorship of a landmark paper describing a unified method for the shear design of concrete structures.
- **Civil Engineering Professor Liam Finn** and Faculty of Applied Science Dean **Michael Isaacson** were elected Fellows of the Engineering Institute of Canada (EIC) in recognition of their exceptional contributions to engineering in Canada.
- **Electrical & Computer Engineering Adjunct Professor Gary Birch** received the 1998 Meritorious Achievement Award from APEGBC in recognition of his extraordinary research and development achievements in human-machine interface and biological signal systems for the severely disabled.
- **Electrical & Computer Engineering Assistant Professor Greg Bond** was honoured with one of the 1999 UBC Killam Teaching Prizes. This prize recognized Professor Bond's outstanding teaching efforts in the area of software engineering, including system testing and operating systems.
- **Electrical & Computer Engineering Professors Guy Dumont and Rabab Ward** were elected Fellows of the IEEE for their respective contributions to digital signal processing applications in television and medical imaging. Professor Dumont also was the first recipient of the IEEE Control Systems Society's Control Systems Technology Award.
- **Electrical & Computer Engineering Professor Hermann Dommel** was presented with a University of Wisconsin-Madison College of Engineering 1998 Distinguished Service Award in recognition of his world-wide reputation in the field of power system transient simulation and in power systems continuing education and short course development.
- **Electrical & Computer Engineering Associate Professor Mike Jackson**, along with John Maycock and Vince Smith of Thomas & Betts Photon Systems in Burnaby, BC, won the Science Council of British Columbia's Business/Education Partnership Award for contributions to the development of revolutionary communication technologies and systems.
- The Electro-Mechanical Design Engineering (EMEC) program was recognized with the 1998 Peter Larkin Award for Outstanding Graduate Programs. This award, presented by the UBC Campus Advisory Board on Student Development, acknowledges contributions and improvements to the student experience and learning environment.
- **Mechanical Engineering Professor Yusuf Altıntas** was named a Fellow of the American Society of Mechanical Engineers in honour of his significant engineering achievements, as well as contributions to the Society and the technical community.
- **Mechanical Engineering Professor Clarence W. de Silva** accepted the 1998 Outstanding Chapter Award of the IEEE Control Systems Society as Chair of the Vancouver Chapter. The award recognized this chapter's distinguished Lecture Series and member activities in 1998.
- **Mechanical Engineering Professor Emeritus Vinod Modi** was presented with the 1999 AIAA Pendray Aerospace Literature Award for his contributions to the literature of aerospace vehicle dynamics, controls and robotics, and for his impact on several generations of students.
- **Metals & Materials Engineering Professor Alec Mitchell** was honoured with an award from the American Vacuum Society for his contributions relating to superalloys.
- **Metals & Materials Engineering Professor Anoush Poursartip** and Assistant Professor **Göran Fernlund** were honoured with Outstanding Performance Awards from The Boeing Company. The awards recognized their contributions to the "Processing for Dimensional Control" research program.

Development activities

Faculty development activities have been in high gear over the last six months. In addition to maintaining our focus on fundraising and alumni networking, we have seen a change in personnel for the Faculty Development Officer portfolio and witnessed positive changes for donors considering gifts of shares.

• On February 1, 1999, we appointed two new Faculty Development Officers: Mr. Robert Appleton and Mr. David Petis, both of whom are experienced in university and healthcare fundraising. Mr. Appleton came to us from previous positions with the BC Cancer Foundation and BC Children's Hospital Foundation. Mr. Petis worked previously with the University of Western Ontario, York University and Victoria Hospital in London, Ontario.

• Last year's federal budget announced positive changes regarding a reduced rate of taxation on capital gains. These changes make it favourable for UBC donors to consider gifts of shares. Under the new guidelines, when donors give listed securities to a public charity or foundation (UBC), only 37.5% of the capital gain becomes taxable, but the donor receives a receipt for the full fair market value of the shares on the date transferred.

For further information on gifts of shares or current fundraising activities, please contact:

Development Officers
Faculty of Applied Science

Tel: 604.822.0603 or 604.822.6197
e-mail: development@apsc.ubc.ca

Engineering the wonders of biology

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earlier. Traditional filters foul when tiny particles block their pores. That doesn't happen with the acoustic filter because sound waves have no fixed pores to foul. Consequently, the cells accumulate in 10-fold greater concentrations and the bioreactors remain highly productive for months.

Clearly, Dr. Piret's research on mammalian cell processes is of significant value. "I think a wonderful thing about our work is

that we're engineering biological products," reflected Dr. Piret. "Whether we are producing therapeutic proteins or hematopoietic cells, we are part of a major effort in biotechnology to harness nature's medicines to fight nature's diseases. Though our work is high tech and often complicated, there is something very natural about it and these developments could have an impact on each of our lives."

Mining memories

Continued from page 4

In addition to his responsibilities with Placer Dome, which officially concluded with his retirement in February, Mr. Laird serves as the Honorary President of the UBC Mining and Mineral Process Engineering Student Society and the Past President of

the Canadian Institute of Mining, Metallurgy and Petroleum. And while his future plans are not yet set, you may be certain that Sandy Laird will continue on, contributing his time and energy as one of our most active and inspirational alumni.

Seminar series

Graduate-level seminar series are open to all who are interested. For more information on specific department seminars, please contact the following:

Chemical and Bio-Resource Engineering:

Dr. Richard Branion
branion@chml.ubc.ca
Tel: 604.822.3217

Civil Engineering:

Ms. Selene Loke
slope@civil.ubc.ca
Tel: 604.822.2065

Electrical and Computer Engineering:

Dr. Tak Niimura
takn@ee.ubc.ca
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Mechanical Engineering:

Dr. Ian Gartshore
gshore@unixg.ubc.ca
Tel: 604.822.3770

Metals and Materials Engineering:

Dr. Mary Wells
mary@cmpe.ubc.ca
Tel: 604.822.1918

Mining and Mineral Process Engineering:

mmpe@mining.ubc.ca
Tel: 604.822.2540

The Centre for Integrated Computer Systems Research (CICSR):

cicsrinfo@cicsr.ubc.ca
Tel: 604.822.6894

In addition, the Office of Continuing Education in Engineering and Architecture offers a wide range of courses and workshops for practicing professionals at the post-baccalaureate level.

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The Faculty's engineering activities include the following:

Departments

- Chemical and Bio-Resource Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Mechanical Engineering
- Metals and Materials Engineering
- Mining and Mineral Process Engineering

Office of the Dean

- Engineering Student Services
- Engineering Co-op Office
- Office of Continuing Education
- Undergraduate Programs (with the Faculty of Science)
 - Engineering Physics
 - Geological Engineering

The Faculty participates in several research centres and laboratories including:

- The Centre for Integrated Computer Systems Research (CICSR)
- The Advanced Materials and Process Engineering Laboratory (AMPEL)
- The Biotechnology Laboratory
- The Pulp and Paper Centre