THE UNIVERSITY OF BRITISH COLUMBIA

19 March 2010

CURRICULUM & ADMISSIONS COMMITTEES
Vancouver Senate
2016 - 1874 East Mall
Vancouver, B.C. Canada V6T 1Z1

To: Vancouver Senate

From: Senate Curriculum & Admission Committees

Re: New Program Proposal for Graduate Program in Genome Science and Technology (approval)

Graduate Program in Genome Science and Technology

The Senate Curriculum and Admissions Committees have reviewed the material forwarded to it by the Faculty of Graduate Studies, and are pleased to recommend as follows:

> *That Senate approve the new Graduate Program in Genome Science and Technology and its associated courses, as set out in the attached report.*

Faculties are reminded that as per the *University Act*, after academic approval has been granted by the Senate, the consent of the Board of Governors and the Minister of Advanced Education must be given before any new degree program may be offered by the University.

Respectfully Submitted,

Dr. David W. Fielding, Chair, Senate Admissions Committee
Dr. Peter Marshall, Chair, Senate Curriculum Committee

THE UNIVERSITY OF BRITISH COLUMBIA

UBC Curriculum Proposal Form
Change to Course or Program

Category: 1

Faculty: College for Interdisciplinary Studies **Department: N/A** **Faculty Approval Date: October 7, 2009** **Effective: Winter Session, First Term, 2010**	**Date: November 2009** **Contact Person: Dr. Steve Withers** **Phone: 604-822-3402** **Email: withers@chem.ubc.ca**
Proposed Calendar Entry: Graduate Program in Genome Science and Technology ***Degrees Offered:*** Ph.D., M.Sc. ***Members:*** ***PROFESSORS*** R. Andersen, S. Aparicio, R. Beavis, P. Cullis, L. Eltis, B. Finlay, R. Hancock, C. Haynes, P. Hieter, M. Marra, L. McIntosh, C. Overall, M. Roberge, S. Withers ***ASSOCIATE PROFESSORS*** J. Bryan, C. Bohlmann, L. Conibear, S. Jones, J. Kast, A. Marziali, D. Perrin ***ASSISTANT PROFESSORS*** L. Foster, J. Gsponer, S. Hallam, C. Hansen, M. Kobor, E. Lagally, C. Loewen, T. Mayor, V. Measday, I. Meyer, P. Pavlidis ***Program Overview:*** The Genome Science and Technology Graduate program is a trans-disciplinary program that combines genomic research with leading-edge technology development in genome sciences for students pursing a M.Sc. or Ph.D. This program is intended to accommodate the diverse background of students and the broad nature of genomic research in human, animal, plant, microbes and viruses. ***Doctor of Philosophy*** ***Admission Requirements:*** Students admitted to the Ph.D. degree program normally possess a M.Sc. degree in genomics or	**URL: URL:** create link to 'Genome Science and Technology' at: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,204,828,0 **Present Calendar Entry: None** **Type of Action: New Program** **Rationale:** Originally, genetics was a field of study with the goal of understanding the nature of the gene, hereditary traits and the role of genetic traits in populations. Genetics is now chiefly important as a method of analysis. The GGP therefore reflects an earlier time, despite the excellence of the researchers and students in the program. The natural descendant of genetics, genomics, encompasses the use of high throughput techniques to acquire information from DNA sequence (genomics), protein expression and interactions (proteomics), gene expression patterns (transcriptomics), and so on, and exploitation of that information for better understanding of biology, or for manipulation of life forms. Crucial to the rise of genomics has been the development of the relevant enabling technologies and the computational capacity to handle the large volumes of data. Given the emergence of this paradigm shattering approach a revisioning process has been undertaken by interested researchers in the Faculties of Applied Science, Forestry, Land and Food Systems, Medicine, Pharmaceutical Sciences and Science. The result has been recognition that the University needs a renamed and refocused interdisciplinary program to attract students

a related area, such as biology, microbiology, molecular biology, medicine or in physical/engineering science, such as computer science, mathematics, statistics, chemistry, physics, chemical engineering, electrical engineering, mechanical engineering, bioengineering, with clear evidence of research ability or potential. Eligibility is determined on the basis of academic achievement, research experience, and letters of recommendation. Transfer from the M.Sc. to the Ph.D. program is permitted under regulations set by the Faculty of Graduate Studies. A minimum TOEFL score of 100 is required on the iBT (internet-based TOEFL), 600 on the paper-based TOEFL or equivalent on other tests approved by the Faculty of Graduate Studies (link to: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,204,345,0). No GRE is required.

Program Requirements:
All doctoral students are required to successfully complete a comprehensive examination, which consists of an oral and written component. The major requirement for the Ph.D. degree is the completion of a research dissertation that meets the Faculty of Graduate Studies guidelines. All students are required to present a Genome Science and Technology Graduate program exit seminar, based on their research, upon completion of their program, and before their dissertation defense

A student's committee for the doctorate will consist of the supervisor and three others. The supervisor and at least one other member must be a member of the Genome Science and Technology graduate program.

Master of Science

***Admission Requirements*:**
Successful applicants require a BSc or equivalent, majoring in a biological discipline (such as biology, genetics, microbiology, molecular biology, medicine) or in physical/engineering science (such as computer science, mathematics, statistics, chemistry, physics, chemical engineering, electrical engineering, mechanical engineering, bioengineering), with a first class standing in their previous degree. Eligibility is determined on the basis of academic achievement, research experience and letters of recommendation.

and boundary-crossing researchers interested in genomics and associated technology development. Such a program would continue to complement existing graduate programs without competing with them. This new program is important because of its potential to increase the number of graduate students, and to increase the effectiveness of graduate training at BC universities, thereby meeting the goals of the provincial government for graduate program growth.

By preparing students across disciplines and facilitating discussions and interactions between trainees with diverse backgrounds the Program shall enable a new generation of researchers, and research collaborations, operating at the interface of the biological and physical sciences**.** The program will apply innovative trans-disciplinary approaches to prepare graduates to:

i) generate a culture of innovation and discovery by exposing trainees at all levels to important and timely scientific problems being addressed using emerging technologies.

ii) ii) enable researchers to effectively work at the nexus of biology, engineering, and physical sciences by providing a unified training program including joint seminars, cross-disciplinary rotations, and hands-on training in new technology and methodology.

iii) provide enriching professional development programs to assist the transition of trainees into both the academic and industrial workforces.

iv) foster close interactions, collaborations, and intellectual exchange with other University and industrial laboratories, nationally and internationally.

Academically acceptable applicants, not selected for the rotation option of the program, must also obtain the commitment of a Genome Science and Technology Graduate program research supervisor before receiving final acceptance from the Program and the Faculty of Graduate Studies. A minimum TOEFL score of 100 is required on the iBT (internet-based TOEFL), 600 on the paper-based TOEFL or equivalent on other tests approved by the Faculty of Graduate Studies (link to: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,204,345,0). No GRE is required.

Program Requirements:
M.Sc. students are required to complete 30 credits, which include required courses GSAT 501 and 502 and an 18-credit thesis. Nine credits of coursework must be numbered 500 or higher. Program-funded scholarship students are also required to complete three nine-week research rotations in their first year. The major requisite for the M.Sc. degree is the completion of a research thesis that meets the Program's requirements

A student's committee for the M.Sc. degree will consist of their thesis supervisor and two other members. The supervisor and at least one other member must be members of the Genome Science and Technology Graduate program. All students are required to present a Genome Science and Technology Graduate program exit seminar, based on their thesis research, upon completion of their program, and before their thesis defense.

Contact Information:
Genome Science and Technology Graduate Program
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THE UNIVERSITY OF BRITISH COLUMBIA

UBC Curriculum Proposal Form
Change to Course or Program

Category: (1)

Faculty: Graduate Studies **Department:** Genome Science and Technology Graduate Program **Faculty Approval Date: Oct 10, 2009** **Effective Session:** Winter Term 1 **Year for Change:** 2010	**Date:** August 5, 2009 **Contact Person:** Sharon Ruschkowski **Phone:** 604-707-5803 **Email:** sharonr@bcsc.ca
Proposed Calendar Entry: **GSAT 501 (3) Intensive Laboratory Course** **Theory, application and operation of instrumentation employed in modern genomics research: data analysis.**	**Calendar URL: N/A** **Type of Action: New Course** **Rationale:** There is an identified need for an interdisciplinary Graduate Program in Genome Science and Technology to replace the current Genetics Graduate Program and train a new generation of interdisciplinary researchers in this discipline, which is extremely technology-driven. The new Program will promote a rigorous training in genome science and technology and will ensure that graduates of the Program acquire the skills that are necessary to establish fulfilling careers in research and teaching. This one month course at the beginning of their program will formally introduce the instrumentation and approaches that students will be using in subsequent research rotations. By including theory components along with hands-on training and the establishment of 'mini-projects' in each area the students will have a good exposure to the potentials and pitfalls of each technology. This course will also help students in choosing their rotations and subsequent thesis advisors.

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UBC Curriculum Proposal Form
Change to Course or Program

Category: (1)

Faculty: Graduate Studies **Department:** Genome Science and Technology Graduate Program **Faculty Approval Date: Oct 10, 2009** **Effective Session:** Terms 1 and 2 **Year for Change:** 2010	**Date:** August 5, 2009 **Contact Person:** Sharon Ruschkowski **Phone:** 604-707-5803 **Email:** sharonr@bcsc.ca
Proposed Calendar Entry: **GSAT 502 (3) Advanced Concepts in Genome Science and Technology** **Current approaches to high-throughput, system-wide analysis and manipulation of biological systems**	**Calendar URL: N/A** **Type of Action: New Course** **Rationale:** There is an identified need for an interdisciplinary Graduate Program in Genome Science and Technology to replace the current Genetics Graduate Program and train a new generation of interdisciplinary researchers in this discipline, which is extremely technology-driven. The new Program will promote a rigorous training in genome science and technology and will ensure that graduates of the Program acquire the skills that are necessary to establish fulfilling careers in research and teaching. This interdisciplinary field of research demands a broad understanding of modern technologies and methods as well as an appreciation for current research questions arising in fields including human health, environmental science, and bio-energy. This year-long lecture and seminar-based course is designed to familiarize students from a broad range of backgrounds with key developments in genome science and technology as well the application of these methods in current research. A particular focus is upon breaking down barriers to communication between biologists and physical scientists. Specific areas of focus include network analysis (genetic and protein interactions), expression analysis, directed evolution, high-throughput screening, proteomics, next generation sequencing, microfluidics, bioinformatics, genomics, metagenomics.

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Faculty: Graduate Studies **Department:** Genome Science and Technology Graduate program **Faculty Approval Date: Oct 10, 2009** **Effective Session** Winter, Term 1 or 2 **Year** 2010	**Date:** August 5, 2009 **Contact Person:** Sharon Ruschkowski **Phone**: 604-707-5803 **Email:** sharonr@bcgsc.ca
Proposed Calendar Entry: **GSAT 503 (3) DIRECTED STUDIES in GENOME SCIENCE AND TECHNOLOGY** **Advanced study under the direction of a faculty member composed of laboratory sessions and/or directed readings related to selected areas of Genome Science and Technology.**	**URL: N/A** **Type of Action:** New Course **Rationale:** In depth training in specialized areas in Genome Science and Technology requires focused literature review and hands-on experience. This course provides students the opportunity to gain in depth expertise in a selected area under the supervision and guidance of faculty with relevant expertise. Such training opportunities are designed to fill gaps that are not available through other course offerings and can provide students with projects that build expertise relevant to their thesis research.