



<p>1.0 Degree Title Please specify the two degrees for concurrent degree programs</p> <input type="text" value="Ph.D."/>	<p>2.0 Administering Faculty/Unit</p> <input type="text" value="Graduate and Postdoctoral Studies"/>
<p>1.1 Major (Legacy = Subject) (30-char. max.)</p> <input type="text" value="Quantitative Life Sciences"/>	<p>Offering Faculty/Department</p> <input type="text" value="Interfaculty Studies (IFS)"/>
<p>1.2 Concentration (Legacy = Concentration/Option) If applicable to Majors only (30 char. max)</p> <input type="text" value="n/a"/>	<p>3.0 Effective Term of Implementation (Ex. Sept. 2004 = 200409) Term</p> <input type="text" value="201809"/>
<p>1.3 Minor (with Concentration, if Applicable) (30char. max)</p> <input type="text" value="n/a"/>	

4.0 Rationale and Admission Requirements for New Proposal

Quantitative Life Sciences is the application of mathematical, computational and other quantitative methods to study biological systems at all scales – from single molecules to the environment. Applicants to the program are expected to have demonstrated strong quantitative skills and a background in mathematics, statistics and computer science, and are expected to hold a M.Sc. in a relevant field and an undergraduate degree in biology, physiology, genetics, computer science, mathematics, statistics, physics or chemistry. Applicants who do not have formal training in life sciences need to have a demonstrated interest, e.g. in the form of an undergraduate research project or the completion of life-science courses.

5.0 Program Information  
Please check appropriate box(es)

<p>5.1 Program Type</p> <p><input type="checkbox"/> Bachelor's Program</p> <p><input type="checkbox"/> Master's</p> <p><input type="checkbox"/> M.Sc. (Applied) Program</p> <p><input type="checkbox"/> Dual Degree/Concurrent Program</p> <p><input type="checkbox"/> Certificate</p> <p><input type="checkbox"/> Diploma</p> <p><input type="checkbox"/> Graduate Certificate</p> <p><input type="checkbox"/> Graduate Diploma</p> <p><input checked="" type="checkbox"/> Ph.D. Program</p> <p><input type="checkbox"/> Doctorate Program (Other than Ph.D.)</p> <p><input type="checkbox"/> Private Program</p> <p><input type="checkbox"/> Off-Campus Program</p> <p><input type="checkbox"/> Distance Education Program (By Correspondence)</p> <p><input type="checkbox"/> Other: Please specify</p> <input type="text"/>	<p>5.2 Category</p> <p><input type="checkbox"/> Faculty Program (FP)</p> <p><input type="checkbox"/> Major</p> <p><input type="checkbox"/> Joint Major</p> <p><input type="checkbox"/> Major Concentration (CON)</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Minor Concentration (CON)</p> <p><input type="checkbox"/> Honours (HON)</p> <p><input type="checkbox"/> Joint Honours Component (HC)</p> <p><input type="checkbox"/> Internship/Co-op</p> <p><input checked="" type="checkbox"/> Thesis (T)</p> <p><input type="checkbox"/> Non-Thesis (N)</p> <p><input type="checkbox"/> Other: Please specify</p> <input type="text"/>	<p>5.3 Level</p> <p><input type="checkbox"/> Undergraduate</p> <p><input type="checkbox"/> Dentistry/Law/Medicine</p> <p><input type="checkbox"/> Continuing Studies (Non-Credits)</p> <p><input type="checkbox"/> Masters &amp; Grad Dip &amp; Certs</p> <p><input checked="" type="checkbox"/> Doctorate</p> <p><input type="checkbox"/> Post-Graduate Medicine/ Dentistry</p> <p><input type="checkbox"/> Graduate Qualifying</p> <p><input type="checkbox"/> Postdoctoral Fellows</p>
		<p>5.4 FQRSC (Research) Indicator (For GPS)</p> <p><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p>

6.0 Total Credits

7.0 Consultation with

Related Units       Yes       No

Financial Consult       Yes       No

Attach list of consultations.

## 8.0 Program Description (Maximum 150 words)

The general objective of the Quantitative Life Sciences (QLS) Program is to train Ph.D. students to develop quantitative approaches (technological, computational and statistical) for the collection, analysis, and interpretation of complex data from the life sciences. Our students will ask questions that will drive the biology and medicine of tomorrow, and be equipped to answer them. The goal of these research fields is to understand the biological whole: how complex interactions among the individual components (e.g. molecules, genes, cells) underlie entire living systems (e.g. cells, organisms, environments). Key elements of the proposed program have been designed to broaden the contextual knowledge of students, to encourage interactions between traditional fields of research and to create a sense of community. The QLS will span departments and faculties, and provide breadth of understanding as well as depth of knowledge to core aspects of bioscience research.

## 9.0 List of proposed program for the New Program/Major or Minor/Concentration

If new concentration (option) of existing Major/Minor (program), please attach a program layout (list of courses) of existing Major/Minor.

Proposed program (list course as follow: Subj Code/Crse Num, Title, Credit weight, under the heading of: Required Courses, Complementary Courses, and Elective Courses).

**Overview:**

The proposed program will include 5 basic elements:

1. [Breadth] One two semester required foundational course
2. [Breadth] A research seminar with invited speakers
3. [Depth] Complementary courses including both life science and quantitative courses, to be selected on based on the student's chosen area of research/stream and in conjunction with the student's supervisory committee
4. [Breadth + Depth] A comprehensive exam
5. [Depth] A research thesis

**Required Courses (6 credits total)**

QLSC 600 Foundations of Quantitative Life Sciences (6 credits, 2 terms)

QLSC 701 Comprehensive Exam (0 credits)

**Complementary Courses (9 credits total)**

Students will be required to take one or two courses from each of the Quantitative and Life Science Blocks for a total of three, stream-specific courses. Each course listed below is worth 3 credits.

**Biophysics Stream**

Quantitative Block	Life Sciences Block
BMDE 512 Finite-Element Modelling: BME BMDE 519 Biomedical Signals & Systems BIEN 530 Imaging and Bioanalytical Instrumentation CHEM 514 Biophysical Chemistry. CHEM 520 Methods in Chemical Biology COMP 551 Applied Machine Learning PHYS 519 Advanced Biophysics PHYS 559 Advanced Statistical Mechanics	BIOC 605 Protein Biology and Proteomics BIOL 551 Principles of Cellular Control PHGY 518 Artificial Cells PHGY 520 Ion Channels

**Computational and Statistical Molecular Biology Stream**

Quantitative Block	Life Sciences Block
BIOS 601 Epidemiology: Introduction and statistical models. BMDE 502 BME Modelling & Identification COMP 561 Computational Biology Methods and Research COMP 598 Topics in Computer Science: Advanced Computational Biology Methods HGEN 677 Advanced statistical methods in genetics and genomics. MATH 523 Generalized Linear Models MATH 680 Computation Intensive Statistics	BIOC 603 Genomics and Gene Expression. BIOL 551 Principles of Cellular Control EXMD 602 Techniques in Molecular Genetics. HGEN 661 Population Genetics HGEN 692 Human Genetics. PHAR 503 Drug Discovery & Development 1 PHAR 505 Structural Pharmacology

**Ecosystems Stream**

Quantitative Block	Life Sciences Block
ENVB 506 Quantitative Methods in Ecology MATH 523 Generalized Linear Models MATH 525 Sampling Theory and Applications MATH 533 Honours Regression and Analysis of Variance MATH 537 Mathematical Models in Biology MATH 547 Stochastic Processes MATH 556 Mathematical Statistics 1	BIOL 509 Methods in Molecular Ecology BIOL 510 Community Ecology BIOL 594 Advanced Evolutionary Ecology ENVR/BIOL 540 Ecology of Species Invasion

Please see the attached QLS Program Executive Summary.

10.0 Approvals

Routing Sequence

Department

Name

Signature

Date

Curric/Acad Committee Chair

Celia Greenwood

*Celia Greenwood*

7 Dec 2016

Faculty 1/Program Executive Committee Chair

Peter Grutter

*PG*

8-12-2016

Faculty 2/Program Steering Committee Chair

Josephine Nalbantoglu

*JNalbantoglu*

Dec 7, 2016

Faculty 3

CGPS

SCTP

APC

Senate

Submitted By

Name

Maggie Do Couto

To be completed by ARR:

Phone

514-398-3050

CIP Code

Email

maggie.docouto@mcgill.ca

Submission Date

Nov. 28, 2016

## QUANTITATIVE LIFE SCIENCES PH.D. PROGRAM EXECUTIVE SUMMARY

We propose a novel inter-department and inter-faculty Ph.D. training program in Quantitative Life Sciences to produce the next generation of leaders in the rapidly changing world of biology, medicine and biotechnology. This program has been designed from the ground-up with close consultation with all stakeholders to produce graduates with the quantitative and interdisciplinary skills that Quebec and Canada need to maintain their positions as world-leaders in bio- and life-science research. It builds on, integrates and expands many currently loosely connected initiatives at McGill and will enable a stimulating, sustained and exciting interdisciplinary training environment.

The **Quantitative Life Sciences Program** (Figure 1) fits centrally into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics among others. Overall, the goal of these research fields is to understand the *biological whole*: how the complex interactions among the individual components (e.g., molecules, genes, cells) underlie entire living systems (e.g., cells, organisms, environments). To achieve this goal, active research lies at the interface between biological processes and advanced mathematics, physics, statistics and computer science. Here we are proposing an interdisciplinary doctoral level program to support this endeavor.

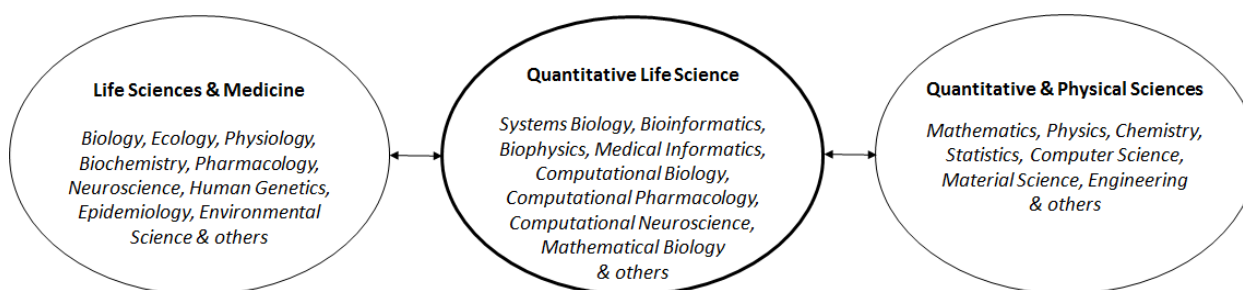


Figure 1. The Quantitative Life Science Program will train the next generation of multidisciplinary researchers needed to bridge the life and quantitative sciences. In addition, this new graduate program will facilitate collaborative life science research that cuts across departments and faculties at McGill University.

At the core of this proposal is a large multidisciplinary group of McGill researchers focused on quantitative approaches to understanding genetic, molecular & physiological systems, global ecosystems and disease interactions. McGill University has been very successful in hiring and bringing together interdisciplinary researchers to tackle the most important life science questions. The University has also taken first steps toward facilitating interdisciplinary training (e.g. through department specific graduate options and several research Centres or NSERC/CIHR funded training programs), but it still lacks a cohesive, cross-department and cross-faculty graduate program to train our students in this essential multidisciplinary field. We thus propose an interdisciplinary Ph.D. training program engaged in applied mathematical, statistical, physical and computational research that connects to all aspects of the life sciences, and capitalizes on the commonalities in quantitative methods in disparate fields.

Key elements of the proposed program have been designed to broaden the contextual knowledge of students, to encourage interactions between traditional fields of research and to create a sense of community. For example, a core course including a series of in-depth case studies will demonstrate links between quantitative methods and life sciences research in many different contexts. The depth of the proposed Ph.D. program is built around three different areas of research, or streams, defined by the type of biological questions being addressed and the quantitative approach being used (additional streams may be added later depending on the evolution of the field and demonstrated sufficient interest). Co-supervision of graduate students between life and quantitative researchers will be strongly encouraged. The program's streams are:

- **Computational and statistical molecular biology:** Quantitative methods in genetics/genomics and molecular biology
- **Biophysics:** Application of physical principles, development of tools and modeling approaches to quantitatively study biological systems, including biomolecules.
- **Ecosystems:** Mathematical and computational approaches in ecology and evolution.

The interest and the demand for interdisciplinary research in quantitative life sciences has led to the formation of new international graduate programs in the US and Europe, which emphasize quantitative research skills applied to the life sciences. Worldwide, governments and industry have begun to invest in quantitative life science and many top research universities worldwide have launched similar themed programs. This proposal is timely, and already in demand by McGill University students and researchers.

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: March 10, 2016

TO: **Dr. Albert M. Berghuis**  
Chair, Department of Biochemistry

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

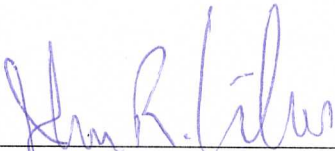
We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- BIOC 603: Genomics and Gene Expression.
- BIOC 605: Protein Biology and Proteomics

Would you kindly review the attached proposal and let us know whether or not you any objections or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response at the earliest.**

    X     NO OBJECTIONS                                           SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Signature:   
(Prof. John Silvius, Chair, Curriculum Committee, Dept of Biochemisry)

Date:     Mar. 10, 2016    

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Dan Nicolau** *D. Nicolau*  
Chair, Department of Bioengineering

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following course from your department in the list of complementary courses that students could register for as part of the PhD Program:

- BIEN 530 Imaging and Bioanalytical Instrumentation

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

    X     NO OBJECTIONS                                           SOME OBJECTIONS

COMMENTS (included here or emailed separately):

The Department of Bioengineering is pleased to support, with no objections, the inclusion of BIEN 530 Imaging and Bioanalytical Instrumentation as a complementary course in the Quantitative Life Sciences curriculum.

The Bioengineering Department will be happy to contribute more courses to the curriculum if needed, for example, BIEN 570 Active Mechanics in Biology, and BIEN 550 Biomolecular Devices.

Signature:

*Sabine Dhir*

Date:

*Feb, 24, 2016*

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Graham Bell**  
Chair, Department of Biology

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. This program will be presented at an upcoming meeting of the Faculty of Science. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- BIOL 551 Principles of Cellular Control
- BIOL 509 Methods in Molecular Ecology
- BIOL 510 Community Ecology
- BIOL 540 Ecology of Species Invasion
- BIOL 434 Theoretical Ecology
- BIOL 594 Advanced Evolutionary Ecology
- BIOL 551 Principles of Cellular Control

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

NO OBJECTIONS                       SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Our only minor comment is that we have the capacity to absorb a few more students in the proposed courses (indicated above). I suspect that that is in the neighborhood of what the program is anticipating as Peter Grutter previously indicated on his foundations course proposal for this program that it has an anticipated enrollment of 10 students (and there are 3 streams, of which only one includes Biology).

Signature:



Date: April 13, 2016 \_\_\_\_\_

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).



## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: March 11, 2016

TO: **Dr. Robert Kearney**  
Chair, Department of Biological

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- BMDE 502 BME Modelling & Identification
- BMDE 519 Biomedical Signals & Systems
- BMDE 512 Finite-Element Modelling: BME

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response at your earliest convenience.**

    X     NO OBJECTIONS                                           SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Masad Damha**  
Chair, Department of Chemistry

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. This program will be presented at an upcoming meeting of the Faculty of Science. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- CHEM 514 Biophysical Chemistry
- CHEM 520 Methods in Chemical Biology

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

NO OBJECTIONS                       SOME OBJECTIONS

COMMENTS (included here or emailed separately):

We might also recommend CHEM 555 NMR spectroscopy and CHEM 575 Chemical Kinetics as suitable complementary courses.

Signature: \_\_\_\_\_



Date: \_\_\_\_\_



Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec,

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Gregory Dudek**  
Chair, Department of Computer Science

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. This program will be presented at an upcoming meeting of the Faculty of Science. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- COMP 652 Machine Learning
- COMP 561 Computational Biology Methods and Research
- COMP 618 Functional Genomics
- COMP 522 Modeling and Simulations

Would you kindly review the attached proposal and let us know whether or not you have any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

\_\_\_\_\_ NO OBJECTIONS                        X   SOME OBJECTIONS

COMMENTS:

- COMP 652 is advanced course which concentrates more on theory than practice, and as such we do not feel it is suitable for the proposed QLS program. It should be replaced by COMP 551 Applied Machine Learning (taught by Prof. Joelle Pineau) which will be offered starting Fall 2016.
- COMP 618 should be dropped from the list, since its future is uncertain. We are planning to replace it with a new 500 level course that would be a follow up to COMP 364 (Computer Tools for the Life Sciences). If this new course it is approved, it would be offered in Fall 2017. This new course would be more suitable for this program.
- COMP 522 is no longer offered because the instructor has left McGill, and so it should be removed from the list.

**N.B. For other comments on the Proposed Program itself, please refer to our Consultation for QLSC 600.**

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: October 3, 2016

TO: **Dr. Bettina Kemme**  
Chair, Department of Computer Science

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. This program will be presented at an upcoming meeting of the Faculty of Science. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- COMP 551 Applied Machine Learning
- COMP 561 Computational Biology Methods and Research
- COMP 598 Topics in Computer Science: Advanced Computational Biology Methods

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response at your earliest convenience.**

\_\_\_\_\_NO OBJECTIONS

\_\_\_\_\_SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [sabine.dhir@mcgill.ca](mailto:sabine.dhir@mcgill.ca)

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Gilles Paradis**  
Chair, Department of Epidemiology & Biostatistics

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following course from your department in the list of complementary courses that students could register for as part of the PhD Program:

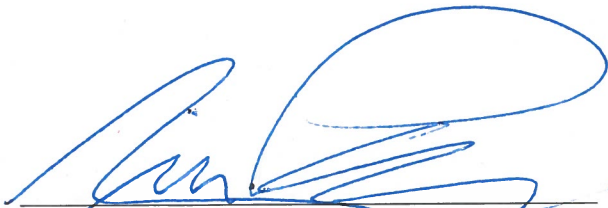
- BIOS 601 Epidemiology: Introduction and Statistical Models

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

NO OBJECTIONS
  SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Signature:



Date:

Mar 17, 2016

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).



## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Eric Shoubridge**  
Chair, Department of Human Genetics

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- HGEN 661 Population Genetics
- HGEN 677 Advanced Statistical Methods in Genetics and Genomics
- HGEN 692 Human Genetics

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

x

\_\_\_\_\_NO OBJECTIONS                      \_\_\_\_\_SOME OBJECTIONS

COMMENTS (included here or emailed separately):

This is a terrific initiative, which I wholeheartedly support!

Signature: \_\_\_\_\_



Date: \_\_\_\_\_  
5 April, 2016

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: March 16, 2016

TO: **Dr. David A. Stephens**  
Chair, Department of Mathematics and Statistics

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. This program will be presented at an upcoming meeting of the Faculty of Science. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

- MATH 680 Computation Intensive Statistics
- MATH 523 Generalized Linear Models
- MATH 525 Sampling Theory and Applications
- MATH 537 Mathematical Models in Biology
- MATH 547 Stochastic Processes
- MATH 533 Honours Regression and ANOVA
- MATH 556 Mathematical Statistics 1

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive at your earliest convenience.**

NO OBJECTIONS                      \_\_\_\_\_ SOME OBJECTIONS

COMMENTS (included here or emailed separately):

I am happy to support this initiative.

Signature: \_\_\_\_\_



Date: 17<sup>th</sup> March 2016

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 23, 2016

TO: **Dr. Anne-Marie Lauzon**  
Chair, Department of Medicine

FROM: **Dr. Sabine Dhir**, on behalf of **Dr. Josephine Nalbantoglu**, Dean Graduate and Postdoctoral Studies

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following course from your department in the list of complementary courses that students could register for as part of the PhD Program:

- EXMD 602 Techniques in Molecular Genetics

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 29<sup>th</sup> 2016.**

NO OBJECTIONS                       SOME OBJECTIONS

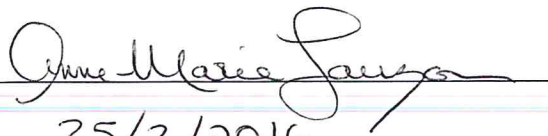
COMMENTS (included here or emailed separately):

Both the department and the course coordinators think this new program is a great idea. One comment which we wish to make is that, as appears from the program proposal which was sent, the course EXMD602 is part of the *Computational and Statistical Molecular Biology Stream - Life Science Block*. It should be noted that, although there are some statistical principles and computational approaches taught in EXMD-602, this is only a minor aspect of the course. The course is intended to expose the students to the most recent molecular approaches used to study human genetic diseases and their general applications to understand mechanisms of disease.

Finally, it should be noted that this course normally requires "Instructor Approval" due to the fact that students who wish to take this course must have a basic knowledge of molecular biology and at least 1 course of basic genetics.

I attach an outline of the course for the current year for your information.

Signature: \_\_\_\_\_



Date: \_\_\_\_\_

25/2/2016

Please return to Sabine Dhir PhD, James Administration Building, Room 400, 845 Sherbrooke St. West, Montreal, Quebec, or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).



**ADVANCED TECHNIQUES IN MOLECULAR GENETICS 2016**  
**EXMD-602**  
**WEDNESDAY 1h00 – 3h00 PM**  
**McIntyre Building, ROOM 1345**

DATE	TOPIC	FACULTY
January 13 2016	Detection of gene product and quantification of gene expression	D. Radzioch
January 20 2016	Immunohistochemistry	D. Radzioch
January 27 2016	Anti-sense technology	D. Radzioch
February 3 2016	Complex Trait Genetics	E. Schurr
February 10 2016	Human Linkage and Association Studies	J. Engert
February 17 2016	Gene therapy	D. Cournoyer
February 24 2016	Students' presentations	Malo/Radzioch
March 2 2016	READING WEEK	
March 9 2016	Gene regulatory network	R. Sladek
March 16 2016	Next generation sequencing: technologies and applications	G. Bourque
March 23 2016	Mouse genetics	D. Malo
March 30 2016	Mouse genetics	D. Malo
April 6 2016	Mutagenesis and transgenesis	M. Bouchard
April 13 2016	Students' presentations	Malo/Radzioch
April 20 2016	EXAM_N2/2 Stewart Building	Malo/Radzioch

**Evaluation:** Presentation 40%; Final Exam 60%

*In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.*

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see <http://www.mcgill.ca/integrity> for more information).



## APPENDIX B

**CONSULTATION REPORT FORM  
RE AD HOC PROGRAM PROPOSAL  
PhD Program in Quantitative Life Sciences**

DATE: February 22, 2016

TO: Dr. Peter Grutter  
Chair, Department of Physics

FROM: Dr. Sabine Dhir

We are requesting consultation from your department regarding a new multidisciplinary quantitative life sciences graduate program currently being developed at McGill University. The proposed Ad Hoc Interdisciplinary PhD Program in Quantitative Life Sciences fits into a rapidly expanding interdisciplinary field that includes ecology, physiology, genetics, systems biology, computational biology, bioinformatics, mathematical biology, evolutionary biology and biophysics. Key elements of the program have been designed to broaden the contextual knowledge of students and to encourage interactions between different fields of research. The three areas of specialization within the program are: Computational and Statistical Molecular Biology, Biophysics and Ecosystems. There is strong interest and demand for quantitative research skills to be applied to the life sciences, and we feel this program proposal is quite timely.

We would like to include the following courses from your department in the list of complementary courses that students could register for as part of the PhD Program:

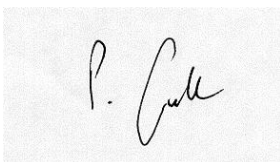
- PHYS 519 Advanced Biophysics
- PHYS 559 Advanced Statistical Mechanics

Would you kindly review the attached proposal and let us know whether or not you any objections to, or comments regarding the complementary course(s) from your department to be included as part of the Ad Hoc PhD Program in Quantitative Life Sciences. **We would be grateful to receive your response by February 26<sup>th</sup> 2016.**

\_\_\_\_\_x\_\_\_\_\_NO OBJECTIONS                      \_\_\_\_\_SOME OBJECTIONS

COMMENTS (included here or emailed separately):

Great program!



Signature:

Date: 22.2.2016

Please return to Sabine Dhir, PhD, GPS OFFICE ADDRESS or fax 514-398-6283 or email [academicprograms.gps@mcgill.ca](mailto:academicprograms.gps@mcgill.ca).

