



CUMMING SCHOOL OF MEDICINE
GRADUATE COURSE OUTLINE

COURSE TITLE: Applied Genomics			
Course	MDGE 725		
Pre/Co-Requisites	Course Coordinator Permission		
Faculty	Cumming School of Medicine, Graduate Science Education		
Instructor Name(s)	Dr. Maja Tarailo-Graovac Dr. Marco Gallo	Email	maja.tarailograovac@ucalgary.ca marco.gallo@ucalgary.ca
Office Location	Dr. Tarailo-Graovac: HS 2239 Dr. Gallo: HMRB 305	Office Hours	By arrangement only
Instructor Email Policy	Questions from students sent by email will be replied to within two business days.		
Class Term, Days	Winter 2020, Feb 11, 13, 25, 27, March 3, 5, 10, 12		
Class Times	15:00-16:30 T/R		
Class Location	Feb 11, 13, 25, 27, March 3, 5, 10 : HS G746 March 12: HS 646		

COURSE INFORMATION/DESCRIPTION OF THE COURSE
<p>This module introduces high throughput DNA sequencing technologies and genome-wide association genetics that are rapidly changing the landscape of various fields of biological and medical research. Students will gain an overview of the available genomics technologies and their applications for high throughput discovery in biology (model organisms) and medicine (cancer and Mendelian disease genomics). Discussions will also encompass research ethics considerations for collecting, storing and using human genomic data.</p>
LEARNING RESOURCES/REQUIRED READING
None

COURSE OBJECTIVES/LEARNING OUTCOMES
<ul style="list-style-type: none"> Recognize key genomic techniques and their application to fundamental and preclinical research. Compare high throughput sequencing (long, short-read, linked read, single-cell) methods and their applications. Visualize and interpret genome data for high throughput discovery in model organism. Visualize and interpret genome data for high throughput discovery in Mendelian disease (focus on rare disease).

- Interpret genome data by utilizing *in silico* tools and population datasets.
- Compare available technologies for assessment of epigenomic features in cancer samples and models.
- Recognize the 3D genome architecture concept, and its relationships with genomic variants and epigenomic features.
- Extract meaningful information on biological systems utilizing the publicly available epigenomic datasets.
- Utilize the available technology to explore epigenomic features in cancer samples and models.
- Recognize the complexities of ethical issues connected to the acquisition and analyses of genomic datasets.
- Apply genomics to your research.

CUT POINTS FOR GRADES

This course adheres to the grading system outlined in the University of Calgary, Faculty of Graduate Studies Calendar. Grades of A+ and A are not distinguished in the calculation of GPAs. Percentage/letter grade conversion used for this course is as follows

Grade	Grade Point Value	Percentage Conversion	Graduate Description
A+	4.00	95-100	Outstanding
A	4.00	90-94	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.70	85-89	Very Good Performance
B+	3.30	77-84	Good Performance
B	3.00	72-76	Satisfactory Performance
B-	2.70	68-71	Minimum Pass for Students in the Faculty of Graduate Studies
C+	2.30	63-67	All grades below ‘B-’ are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements

Assessment Components: The University policy on grading related matters is outlined in the [2019-2020 Calendar](#).

Assessment Methods	Description	Weight %	Due Date and Time
Quiz #1	In class, short, written quiz on the previous class/classes material	10	Thursday, Feb 13, 2020 – 15:00



Quiz #2	In class, short, written quiz on the previous class/classes material	10	Tuesday, Feb 25, 2020
Quiz #3	In class, short, written quiz on the previous class/classes material	10	Thursday, Feb 27, 2020
Quiz #4	In class, short, written quiz on the previous class/classes material	10	Tuesday, Mar 03, 2020
Quiz #5	In class, short, written quiz on the previous class/classes material	10	Thursday, Mar 05, 2020
Quiz #6	In class, short, written quiz on the previous class/classes material	10	Tuesday, Mar 10, 2020
Take Home Assignment	Take-Home Assignment (Applied Research Proposal): One-page CIHR Scholarship Application Style	40	Thursday, Mar 12, 2020, 4:30 pm

ASSESSMENT AND EVALUATION INFORMATION

ATTENDANCE AND PARTICIPATION EXPECTATIONS: The classroom should be respected as a safe place to share ideas without judgement – a community in which we can all learn from one another. Students are expected to conduct themselves in a mature and courteous manner during ALL lectures. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic.

To be successful, students are expected to attend ALL CLASSES and take notes during class, and should not rely solely on material supplied by the instructors. Missing two or more lectures may jeopardize your ability to pass / achieve a good grade this course.

GUIDELINES FOR SUBMITTING ASSIGNMENTS: Assignments must be submitted according to the specific instructions provided to you by the instructor at the beginning of the course.

FINAL EXAMINATIONS: There are no Registrar-Scheduled final examinations for this course.

EXPECTATIONS FOR WRITING: Writing skills are important to academic study in all disciplines. In keeping with the University of Calgary’s emphasis on the importance of academic writing in student assignments (section E.2 of 2018-19 Calendar), writing is emphasized, and the grading thereof in determining a student’s mark in this course. The University of Calgary values excellence in writing. Competence in writing entails skills in crafting logical, clear, coherent, non-redundant sentences, paragraphs and broader arguments, as well as skills with the mechanics of writing (grammar, spelling, punctuation). The University of Calgary offers a number of instructional services through the Students’ Success Centre’s Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are strongly encouraged to take advantage of these programs.

LATE AND/OR MISSING ASSIGNMENTS: As a general rule, late assignments will not be accepted and will automatically receive a mark of zero. Students who miss a quiz/test will receive a mark of zero unless the instructor has been notified prior to the start of the class. There will be NO exceptions to this policy.



It is the agreement of all Faculty involved in MDGE courses that extensions will NOT be granted. The only exceptions to this are those in keeping with the University Calendar (debilitating illness, religious conviction, or severe domestic affliction) that are received in writing and with supporting documentation. Traffic jams and late or full buses are common events in Calgary and are NOT acceptable reasons for late arrivals to class or examinations. Please note that while absences are permitted for religious reasons, students are responsible for providing advance notice and adhering to other guidelines on this matter, as outlined in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/e-4.html>). In this case, alternative arrangements will be made.

Is a passing grade on a particular component essential to pass the course as a whole? No

COURSE TIMETABLE		
Course Schedule Date	Topic & Reading	Instructor
Tuesday, Feb 11, 2020	<u>Introduction to genomics</u> MDGE725 outline, Expectations, Assessment	Tarailo-Graovac, Gallo
Thursday, Feb 13, 2020	<u>Short- and long-read sequencing</u> Quiz #1	Tarailo-Graovac
Tuesday, Feb 25, 2020	<u>Single-cell genomics and linked-read sequencing</u> Quiz #2	Gallo
Thursday, Feb 27, 2020	<u>Applied Genomics (Model Organisms); BRING LAPTOP</u> Please Install Integrative Genomics Viewer (IGV) ; Quiz #3	Tarailo-Graovac
Tuesday, Mar 03, 2020	<u>Applied Genomics (Mendelian Disease); BRING LAPTOP</u> Quiz #4	Tarailo-Graovac
Thursday, Mar 05, 2020	<u>Epigenomics and 3D genome architecture</u> Quiz #5	Gallo
Tuesday, Mar 10, 2020	<u>Hands-on epigenomic workshop; BRING LAPTOP</u> Quiz #6	Gallo
Thursday, Mar 12, 2020	<u>Ethics in applied genomics</u> Final Assignment Due	Tarailo-Graovac, Gallo

INTERNET AND ELECTRONIC COMMUNICATION DEVICE INFORMATION

Cell phones must be turned off in class unless otherwise arranged with the instructor.



The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. Students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube). Students are responsible for being aware of the University's Internet and email use policy, which can be found at <https://www.ucalgary.ca/policies/files/policies/electronic-communicationspolicy.pdf>.

MEDIA AND RECORDING IN LEARNING ENVIRONMENTS

Media recording for lesson capture

The instructor may use media recordings to capture the delivery of a lecture. These recordings are intended to be used for lecture capture only and will not be used for any other purpose. Although the recording device will be fixed on the Instructor, in the event that incidental student participation is recorded, the instructor will ensure that any identifiable content (video or audio) is masked, or will seek consent to include the identifiable student content to making the content available on University approved platforms.

Media recording for assessment of student learning

The instructor may use media recordings as part of the assessment of students. This may include but is not limited to classroom discussions, presentations, clinical practice, or skills testing that occur during the course. These recordings will be used for student assessment purposes only and will not be shared or used for any other purpose.

Media recording for self-assessment of teaching practices

The instructor may use media recordings as a tool for self-assessment of their teaching practices. Although the recording device will be fixed on the instructor, it is possible that student participation in the course may be inadvertently captured. These recordings will be used for instructor self-assessment only and will not be used for any other purpose.

Student Recording of Lectures

Audio or video recording of lectures is prohibited except where explicit permission has been received from the instructor.

UNIVERSITY OF CALGARY POLICIES AND SUPPORTS

ACADEMIC ACCOMMODATIONS

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full



policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>

IMPORTANT INFORMATION

Any research in which students are invited to participate will be explained in class and approved by the appropriate University Research Ethics Board

COPYRIGHT

It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University's Fair Dealing Guidance for Students (library.ucalgary.ca/files/library/guidance_for_students.pdf). Further information for students is available on the Copyright Office web page (<https://library.ucalgary.ca/copyright>)

A NOTE REGARDING INSTRUCTOR INTELLECTUAL PROPERTY

Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor (s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course *at the same time* may be allowed under fair dealing

ACADEMIC INTEGRITY

The Cumming School of Medicine expects intellectual honesty from its students. Course participants should be aware of University policies relating to Principles of Conduct, Plagiarism and Academic Integrity. These are found in the printed Faculty of Graduate Studies Calendar, or online under Academic Regulations in the Faculty of Graduate Studies Calendar, available at [Faculty of Graduate Studies Academic Regulations](#)

ACADEMIC MISCONDUCT

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

EMERGENCY EVACUATION AND ASSEMBLY POINTS

Assembly points for emergencies have been identified across campus. The primary assembly points for South Campus (Health Science Centre (HSC); Health & Research Innovation Centre (HRIC); Heritage Medical Research Building (HMRB) and Teaching, Research and Wellness (TRW)) are:

- HSC and HMRB: HRIC Atrium (alternate assembly point is Parking Lot 6)
- HRIC: HMRB Atrium (alternate assembly point is Parking Lot 6)
- TRW: McCaig Tower (alternate assembly point is HMRB – Atrium)

APPEALS

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section N of the Faculty of Graduate Studies Calendar. Students must follow the official process and should contact the Student Ombuds Office (<http://www.ucalgary.ca/provost/students/ombuds>) for assistance with this and with any other academic concerns, including academic and non-academic misconduct



THE FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY (FOIP) ACT

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission

WELLNESS AND MENTAL HEALTH RESOURCES

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre), <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services> and the Campus Mental Health Strategy website <https://www.ucalgary.ca/mentalhealth/>

SUPPORTS FOR STUDENT LEARNING, SUCCESS, AND SAFETY

Student Ombudsman: The Student Ombuds' Office supports and provides a safe, neutral space for students. For more information, please visit www.ucalgary.ca/ombuds/ or email ombuds@ucalgary.ca

Student Union: The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca; Information about the SU, including elected Faculty Representatives can be found here: <https://www.su.ucalgary.ca>

Graduate Student's Association: The GSA Vice-President Academic can be reached at (403) 220- 5997 or gsa.vpa@ucalgary.ca; Information about the GSA can be found here: <https://gsa.ucalgary.ca>

SAFEWALK

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 403-220-5333 or visit <http://www.ucalgary.ca/security/safewalk>. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths. Please ensure your personal safety by taking advantage of this service.