

## CS9877 - Research Topics in Genomics and Proteomics / CS4463 - Computational Biology

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### Course description ([course web site](#))

Genomics and proteomics are two rapidly growing areas of molecular biology that are already causing a revolution in medicine. While genomics is concerned with the sequencing and analysis of an organism's genome, proteomics studies the organism's proteome (the entire set of proteins), including protein abundances, variations, modifications, and their interactions with other proteins or DNA. The two fields aim to understand cellular processes and their relation with diseases. The course will provide first an introduction to basic concepts of computational molecular biology, including sequence alignment, dynamic programming, BLAST, spaced seeds, suffix trees, suffix arrays, Markov chains, hidden Markov models, profile HMMs for sequence families, multiple sequence alignment methods, etc. Then, current and emerging research topics in genomics and proteomics will be discussed including DNA sequencing, error correction, genome assembly, assembly evaluation, genome resequencing, variation discovery, metagenomics, primer design, DNA splice junction prediction, DNA-protein binding prediction, protein-protein interaction prediction, protein-protein interaction network alignment, protein structure prediction, protein contact map prediction, gene expression inference, cancer diagnosis, alignment-free homology detection, etc.

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### Prerequisites

CS9877: None.

CS4463: Computer Science 3331A/B and 3340A/B; Biochemistry 2280A is recommended

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### Instructor

- Prof. [Lucian Ilie](#), MC378, e-mail: [ilie@uwo.ca](mailto:ilie@uwo.ca)
    - Office hours: Wednesdays, 10:30 - 11:30am and 3:30 - 4:30pm, MC378
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### Class time

- Wednesdays, 1:30 - 3:30pm, MC316
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### Useful books (not required)

- W.J. Ewens, G.R. Grant, *Statistical Methods in Bioinformatics*, 2nd edition, Springer, New York, 2005.
  - R. Durbin, S. Eddy, A. Krogh, G. Mitchison, *Biological Sequence Analysis*, Cambridge Univ. Press, 1998 (11th printing, 2006).
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### Evaluation -- CS9877 (tentative):

- Participation: **20%**
  - Presentations (given by each student in class): **80%**
    - Schedule - TBA
    - [Evaluation guidelines](#)
  - There will be no assignments or exams
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### Evaluation -- CS4463 (tentative):

- Participation: **20%**
  - Choice between assignments and presentation (to be discussed in class): **80%**
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## Accommodation and Accessibility

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean's Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at [scibmsac@uwo.ca](mailto:scibmsac@uwo.ca).

For further information, please consult the university's policy on academic consideration for student absences:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Consideration\\_for\\_absences.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf).

If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see

[http://www.registrar.uwo.ca/examinations/exam\\_schedule.html](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

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## Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

No cheat-sheets (or any other sheets), books, or electronic devices are permitted during exams (midterm and final).

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

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## Support Services

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

The policy on Accommodation for Students with Disabilities can be found here:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic%20Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf).

The policy on Accommodation for Religious Holidays can be found here:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_religious.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf).

Students who are in emotional/mental distress should refer to Mental Health@Western

([http://www.health.uwo.ca/mental\\_health](http://www.health.uwo.ca/mental_health)) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.

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