Graduate Program in Computer Science
University of British Columbia Okanagan[1]

PROGRAM INFORMATION

Name of Credential: M.Sc. and Ph.D.

Title: Graduate Program in Computer Science

Unit Offering the Program: Department of Computer Science, Mathematics, Physics, and Statistics (CMPS), Irving K. Barber Faculty of Science, UBC Okanagan

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PROGRAM OBJECTIVES

The computer science graduate program at the University of British Columbia's Okanagan campus in Kelowna, BC offers tier-one research-based degrees to students in a collegial, close-knit setting.
Our dynamic faculty and students are engaged in a variety of research projects, many in collaboration with partners in government, non-profit agencies or industry.
Our research-based MSc and PhD degrees in computer science provide students with theoretical, practical and analytical expertise, as well as experience in the application of scientific results to real-world problems.
It provides students with opportunities for research in the following areas of specialization: Algorithm design and analysis, Artificial intelligence, Computational statistics, Computer science education, Computing science and computational mathematics, Computer vision and image processing, Databases, Data Analytics, Data Science, Decision support systems, Design and analysis of experiments, Human-computer interaction, Modeling, Network science, Optimization, Scientific computing, Social network models, Software engineering, and other related fields.

[1] Version: Feb. 15th, 2024.

PROGRAM MEMBERSHIP

Continuing Computer Science Graduate Committee (CCSGPC)

Currently, the Continuing Computer Science Graduate Program Committee (CCSGPC) consists of the following Computer Science continuing members:

Name	Rank	Area
Ifeoma Adaji (COSC)	Assistant Professor	Designing and developing behavior change systems and persuasive technologies such as serious games and mobile/web applications; modelling the behaviour of online users in social networks and e-commerce systems; data science; social computing; ethics and trust in persuasive technologies.
Shan Du (COSC)	Assistant Professor	Computer Vision/Graphics; Machine/Deep Learning; Image/Video Processing; Pattern Recognition; Biometrics; Video Surveillance Systems
Yong Gao (COSC)	Full Professor	Algorithmic and computational problems in artificial intelligence and network science; applications in social media and computational biology; graph theory and probabilistic method.
Mohammad Khalad Hasan (COSC)	Assistant Professor	Human-computer interaction, mobile and wearable (e.g., smartwatches, smart glasses) user interfaces, augmented/virtual/mixed reality, information visualization, gesture interaction, computer vision, machine learning, navigation interfaces, input devices.
Fatemeh Hendijani Fard (COSC)	Assistant Professor	Code Intelligence; AI4SE; Code Representation Learning; Mining Software RepositoriesLow resource languages, Knowledge transfer; Model compression; Empirical Software Engineering; Mining Software Repositories; NLP.
Bowen Hui (COSC)	Associate Professor of Teaching	Learning analytics; computer science education; decision making under uncertainty; probabilistic user modeling; human-computer interaction cost models; experiment design and analysis.
Pourang Irani (COSC)	Full Professor	Human-computer interaction; information visualization; ubiquitous interfaces; visual analytics; immersive technologies; persuasive health; input devices.
Patricia Lasserre (COSC)	Associate Professor	Machine Learning, Computer vision, OCR, Immersive education and collaboration (serious games, augmented/virtual/mixed reality)y.
Ramon Lawrence (COSC)	Full Professor	Database systems and data analytics including data integration; analysis of large-scale scientific data sets and embedded databases for Internet of Things applications; software engineering and system development.
Yves Lucet (COSC)	Full Professor	Computational mathematics, optimization and convex analysis; modeling; model road design to minimize construction costs under safety and environmental constraints; creating algorithms for computer-aided convex analysis; visualizing operators in 2D, 3D, and 4D.

Abdallah Mohamed (COSC)	Associate Professor of Teaching	Software engineering; decision support systems (model driven and data driven); component-based software development; creative higher education.
Gema Rodriguez-Perez (COSC)	Assistant Professor	Empirical Software Engineering, Mining Software Repositories, Social aspects of Software Engineering, EDI in Software Engineering, Bug prediction and detection, , Software maintenance and evolution, Open Source Software, Large Language Models
Mohamed Shehata (COSC)	Associate Professor	Computer vision; video and image processing; intelligent cameras; biomedical applications; new algorithms for emerging industrial applications and software design of video surveillance systems.
Barrett Ens (COSC)	Associate Professor	Human-computer interaction, Immersive Analytics, Data Visualisation, Augmented Reality, Virtual Reality
John Braun (Stats)	Full Professor	Computational Statistics
Alex Hill (Astrophysics)	Assistant Professor	Radio, optical, and computational astronomy
Warren Hare (Math)	Full Professor	Numerical optimization
Mostafa Mohamed (COSC)	Lecturer	Medical image analysis, data science

Limited Term Computer Science Graduate Committee (LTCSGPC)

Faculty members with research interests in computer science may become term-limited members and participate in the graduate program through the co-supervision of graduate students. At least one supervisor of every Graduate student must be from the COSC discipline in CCSGPC.

Name	Rank	Area
Rasika Rajapakshe (BC Cancer/UBC Faculty of Medicine)	Adjunct Professor	Medical imaging; deep learning in medical imaging; NLP applications in health care; data engineering

* Individuals who are external to UBC or those who do not hold the rank of tenure-track Professor, Associate Professor or Assistant Professor must also be approved each time they serve on a student's committee by the Dean of the College of Graduate Studies.

GRADUATE PROGRAM IN COMPUTER SCIENCE

ADMISSION REQUIREMENTS

General admission requirements stipulated by the College of Graduate Studies must be satisfied.

Master of Science (M.Sc.): Applicants are normally required to hold:

- a four-year BSc in computer science or a related field, with a minimum average of B+ (76%) or better in their third- or fourth-year classes, or
- at least 12 credits in third- and fourth-year classes in their intended field of study, with an A- (80%) grade or better, **or**
- significant formal training and relevant professional experience
- for international students, they must present evidence of competency to pursue studies in the English language (in accordance with CoGS requirements, please see details below)

Doctor of Philosophy (Ph.D.): Applicants are normally required to:

- hold the academic equivalent of a two-year master's degree in computer science or a related field, with a B+ (76%) average or better,
- demonstrate clear evidence of research ability or potential, and
- for international students, they must present evidence of competency to pursue studies in the English language (please see details below)

Applicants with a degree not specifically in computer science are expected to have undertaken coursework in computer science, such as the equivalent of a minor in computer science. Applicants background training must be sufficient for advanced work in your chosen field.

ENGLISH LANGUAGE REQUIREMENTS

Applicants from a university outside Canada where English is not the primary language of instruction must present evidence of competency to pursue studies in the English language prior to being extended an offer of admission. Please refer to the UBC Okanagan College of Graduate Studies for acceptable English language proficiency tests and required minimum scores:

https://gradstudies.ok.ubc.ca/applying/english-proficiency-requirements/

MINIMUM FUNDING

New students admitted to the Computer Science Program starting September 2024 will have minimum funding of: $24,000 for MSc and $26,000 for PhD.

COMPLETION REQUIREMENTS

The requirements below represent the normal completion requirements for each program. If the proposed course plan deviates from the requirements below, then it must acquire **pre-approval** by the graduate program coordinator and the student supervisory committee.

COMPLETION REQUIREMENTS: Supervisory committee

Throughout either program, a student is guided by the *Student's Supervisory Committee,* which consists of the student's thesis (M.Sc.) or dissertation (Ph.D.) supervisor and at least two graduate program committee members, or consists of two co-supervisors and two other graduate program committee member.[2] When beneficial to the student's progress, the student's Supervisory Committee may include additional members. The Supervisory Committee will form the core of a student's *Thesis* or *Dissertation Proposal Examination Committee*.

COMPLETION REQUIREMENTS: Master of Science (M.Sc.)

Coursework: The student must complete a minimum of 18 credits in coursework and 12 credits for the M.Sc. thesis (COSC 549).

The Supervisory Committee, in consultation with the student, will propose a course plan that will normally conform to the following four requirements.

- **3 credits from COSC 590 (Computer Science Graduate Seminar, taken thrice)**
- **15 credits from elective courses:** Elective courses may include any graduate course (numbered 500 or higher) with the course code COSC/CPSC from either the Okanagan or Vancouver campus. Graduate courses outside these or advanced undergraduate courses (numbered 300 or 400 or higher) **require pre-approval by the Graduate Program Supervisory committee AND the Program Coordinator.**
- Up to 6 credits from upper-year undergraduate courses may be used in the elective courses. However, this should be pre-approved by the supervisor **AND the Program Coordinator** before taking these upper-year undergraduate courses. In general, no upper-year undergraduate course may be used when a graduate version (in any program) of the course exists. Failure to take pre-approval will result in the credits of these courses not counted in the degree credits requirements.
- **12 credits from COSC 549 (Master's Thesis)**
    - MSc students should enroll in COSC 549 every term until graduation.

[2] The supervisory committee must also satisfy all requirements of the College of Graduate Studies. This may require additional members if co-supervisors are used. Consult the CoGS website for details.

Low and Failing Grades:

- 60% is the minimum passing grade for master's students; however, only 6 course credits with grades from 60-67% may be counted toward a master's program. For all other courses, students must obtain a minimum of 68%.
- The student may repeat a course for higher standing or take an alternate course on the recommendation of the graduate program and the approval of the Dean of the College of Graduate Studies. If the graduate program does not make such a recommendation, or if the recommendation is not approved by the Dean of the College of Graduate Studies, the student will be required to withdraw. A student who obtains a grade of less than 68% in a number of courses will normally be required to withdraw. The student will be informed of unsatisfactory academic progress in writing before any action regarding withdrawal is taken.
- When repeating a failed required course, a minimum of 74% must be obtained. Higher minimum grades may be required by the graduate program coordinator or the College of Graduate Studies.
- Students who failed courses should receive "unsatisfactory" progress on their annual progress report.
- Master's students who received grades from 60-67% should receive either "improvement required" or "unsatisfactory" progress on their progress report.

Defense: The M.Sc. defense will be held in accordance with the policies and guidelines of the College of Graduate Studies.

All master's students are required to defend their theses in a final *oral examination,* in which the student will demonstrate his/her knowledge of the material in the thesis. The thesis may be submitted at any time of the year, but candidates are advised to allow ample time for revision and examination. As the thesis is being written, the candidate will be in regular communication with the supervisor.
The student may request an examination once the Supervisory Committee recommends the final draft. Arrangements for the final oral examination are then made. The final oral examination is typically four weeks after the submission of the approved thesis.

Please see the College of Graduate Studies Master's Thesis Scheduling timeline for graduation: **https://gradstudies.ok.ubc.ca/academics/thesis-and-dissertation/examination/**

The defence will follow the guidelines of the College of Graduate Studies. The Examining Committee will include

- The members of the student's Supervisory Committee (at least 3 individuals, see above) and
- One university examiner (UE). The UE will meet the guidelines of the College of Graduate Studies.
- A neutral chair is appointed in consultation with the College of Graduate Studies.
- If the final oral examination results are pass with minor or major revisions, corrections are necessary to produce a revised final version of the thesis.

Please refer to the College of Graduate Studies below for details on examination rules and policies:

https://gradstudies.ok.ubc.ca/academics/thesis-and-dissertation/examination/

COMPLETION REQUIREMENTS: Doctor of Philosophy (Ph.D.)

Steps to completion: The Ph.D. program requires the completion of three steps.

- **Comprehensives:** The student must complete 24 credits of coursework. The courses should assess breadth and ensure students have the background to carry out the research. Following the same format as UBCV CPSC, this requirement will be satisfied by passing 15 credits of breadth requirements and 9 credits of depth requirements. Upper-level courses and above taken during the bachelor, master or Ph.D. can count toward that requirement, although the supervisor and program coordinator must make sure the comprehensives include enough graduate-level courses to meet the learning objectives of the PhD program, especially with respect to depth of content and intensity of learning. The rationale to allow students to take courses instead of self-studying and passing an exam is that, in most cases, the comprehensive exam is the final exam of a graduate-level course. Taking courses simplifies the process, increases the quality assurance, makes the program easier to deliver, and provides more opportunities, e.g., by allowing UBCV CPSC courses. Please consult your program coordinator for unlisted courses that you want to use.
- The 15-credit breadth courses must have one 3-credit course in Theory and the rest from four (or more) different areas in this list: Systems and design, Computational intelligence, Data management and analysis, Graphics and vision, HCI, Scientific computing, Software engineering, Interdisciplinary, and Possible other areas.
- The 9-credit depth courses must include COSC590 (see below), COSC690 (Research Proficiency), and one course taken as a PhD student at UBCO and taught by someone other than the supervisor.
- The depth courses must include COSC590 x3 (each is 1 credit). If the student has done his MSc at UBCO and has taken COSC590 thrice. Then, this COSC590 course can be replaced by any other depth course as the supervisor sees fit.
- Out of the 24 credits, 18 must be at the graduate level (Masters and PhD)
- The courses cannot be more than 7 years old (except with the approval of the supervisor and the program coordinator)
- COSC 690 Research Proficiency: requires carrying out a small research project, writing a technical report, and defending the results orally in front of the student supervisory committee. At UBCO, this requirement is formalized as passing the course COSC 690 (3) Research Skills (most students are expected to complete COSC 690 in the first 12 months). The intent is to quickly detect students who do not meet Ph.D.-level research expectations.

- PhD students should enroll in COSC 649 every term until graduation.
- **Step 1, (normally achieved within 0-12 months)** A) The supervisor and the student put a plan to fulfill the required 24 credits, The supervisor will have the experience and knowledge to satisfy the 24 credit requirement. B) Take COSC690 in the first year (recommended to be completed during the second term of the first year), C) Take COSC 590. Typically the student can do the required 3 times of COSC590 within the first year but you can spread it over the first and second year
- **Step 2, Advance to Candidacy (achieved within 12-36 months):** Student should: A) finish all courses required to fulfill the 24 credits requirements by the end of the second year, B) Take a thesis proposal oral examination.
    - Thesis proposal oral examination: write a thesis proposal and defend it in front of the supervisory committee. This is the standard dissertation prospectus presentation.
    - The thesis proposal should describe the background, literature review, research motivations, research questions, what the student has done so far in terms of research, challenges and milestones, a concrete plan for the remaining period of his research, a timeline with dates for the remaining technical parts, current list of publications, and a list of expected future publications.
        - The thesis proposal should follow UBC thesis format: https://gradstudies.ok.ubc.ca/academics/thesis-and-dissertation/preparation/
        - The thesis proposal must be submitted to the committee members at least 2 weeks before the oral examination date.
        - The examination committee of the thesis proposal exam consists of the supervisor, co-supervisor, and the supervisory committee members only. The length of the proposal examination should not exceed 2.5 hours (30-minute presentation plus 2-hour question period).
        - The entire student supervisory committee should be present for the dissertation proposal examination.
        - The thesis proposal exam consists of an in-camera presentation (20-30 minutes) by the student outlining the dissertation proposal, followed by a question period where the student must demonstrate in-depth knowledge of the proposal and corresponding background material. The Ph.D. Supervisory Committee will have a minimum of two rounds of questions for the student.
        - The dissertation proposal examination is a mandatory formal exam to assess the student's readiness to undertake research at the doctoral level.
        - The supervisor should forward the required paperwork to the grad assistant who will check and verify information and obtain the program coordinator signature. The graduate assistant will then forward the paperwork to the College of Graduate Studies, who will formally inform in writing the student that he/she has advanced to the Ph.D. candidacy.

- In the case of a student failing the thesis proposal examinations, the student will be granted the opportunity to retake the exam 1 time. The retake exam must be within 6 months of the first testing date. If a student fails a retake exam, then they will be asked to withdraw from the program.
- Advancement to Candidacy requires passing the comprehensive requirement, the research proficiency evaluation, and the thesis proposal oral examination. Students are expected to advance to Candidacy within the first 24 months in the program; they will be required to withdraw from the program if they have not advanced within 36 months as per CoGS policies.
- Extensions to the advancement to Candidacy (beyond 36 months) may be granted under exceptional circumstances.

- **Step 3, Dissertation Defense (normally achieved within 48 months):** The students is expected to finish research and defend their thesis in this step.

Dissertation defense: The dissertation defence will be held in accordance with the policies and guidelines of the College of Graduate Studies.

All doctoral candidates are required to take a final oral examination (defence) of the dissertation. The administration of the oral examination follows the policies and guidelines of the College of Graduate Studies.

Ph.D. candidates are advised to allow ample time for revision and examination. As the dissertation is being written, the candidate will regularly communicate with the Supervisory Committee. When a draft that the Supervisory Committee recommends for examination is completed, the student may request the oral examination. A copy of the final draft is then sent to the external examiner.

The Examining Committee will include

- the members of the student's Supervisory Committee (at least 3 individuals, see above),
- one university examiner (UE), and
- one external examiner selected by the supervisor.

The UE and external examiner will meet the College of Graduate Studies guidelines for the UE role and are selected by the supervisor (given the UE and external examiner meet College of Graduate Studies requirements). The external examiner will provide a written report before the final examination of the dissertation can take place.
In addition

- a neutral chair will be recommended by the supervisor and approved by the College of Graduate Studies.

As a result of the final oral examination, corrections may be necessary to produce a final version of the dissertation.

ANNUAL REPORTS AND PROGRESS REQUIREMENTS

Once each year, each graduate student in conjunction with their supervisory committee will complete an annual report. Within the report, the supervisory committee will rate the performance of each Graduate student. The three possible ratings are: SATISFACTORY PROGRESS (SP), SATISFACTORY PROGRESS WITH CONDITIONS (SPWC), and UNSATISFACTORY PROGRESS (USP).

For a Graduate student, the following conditions will normally result in SATISFACTORY PROGRESS.

- Coursework: The student has completed all coursework for the degree, or has taken at least the minimum number of course credits required as outlined in the completion requirements above.
- The student receives at least 68% in all courses taken in that year, maintains a term average of at least 76%, and maintains a cumulative average of at least 80%.
- The student makes satisfactory progress (as determined by his/her supervisor(s)) towards the completion of his/her M.Sc. thesis or Ph.D. dissertation.

A student not meeting the above will normally receive SATISFACTORY PROGRESS WITH CONDITIONS or UNSATISFACTORY PROGRESS unless exceptional circumstances are proven.

- Students who failed courses should receive “unsatisfactory” progress on their annual progress report.
- Master’s students who received grades from 60-67% should receive either “improvement required” or “unsatisfactory” progress on their progress report.

The student will be notified in writing if progress is rated SPWC or USP with a list of specific requirements for the next semester included in the notification. If a student is rated SPWC or USP in a semester, then an interim progress report is required after a 6-month period. The student will be asked to withdraw from the graduate program if the student has accumulated two reports where progress was rated USP.
Failure to complete the annual report on time may result in the loss of TA positions and/or scholarship funding.

Interim Progress report:

- if a student receives a SPWC or USP, the program coordinator will hold a meeting with the student and the supervisory committee where they discuss the plan and specific requirements to successfully be back on track. Following this meeting, an interim progress report must be done after 6 months where this evaluation is done again to review the progress. The student will be asked to withdraw from the graduate program if the student has accumulated two reports where progress is rated USP.
- The student or the supervisor can request an interim progress report at any time of the year if there are serious concerns. However, the maximum number of interim progress reports cannot exceed 3 per year (1 per semester).

PROGRAM ADMINISTRATION

GRADUATE PROGRAM COMMITTEE MEMBERSHIP

Membership in thesis or dissertation committees will be determined in accordance with the policies and guidelines of the College of Graduate Studies.

GRADUATE PROGRAM COORDINATOR

The Computer Science Graduate Program will be administered by the Graduate Program Coordinator (GPC) in consultation with the Associate Head of Graduate Studies and the Department Head. The Graduate Program Coordinator is appointed by the Head in consultation with the continuing members of the Computer Science Graduate Program Committee. The Graduate Program Coordinator acts as liaison with the College of Graduate Studies and helps with the following tasks:

- Arranging the review of applications to the program and notifying applicants of the outcome.
- Approving the composition of students' Supervisory Committees.
- Ensuring that students' Supervisory Committees conduct annual reviews.
- Help with logistics and approve advancement to Candidacy.
- Ensuring that program standards are maintained.
- Streamlines the applications to the MSc and PhD graduate programs

STUDENT SUPERVISOR/CO-SUPERVISOR/SUPERVISORY COMMITTEES

Membership in supervisory committees will be determined in accordance with the policies and guidelines of the College of Graduate Studies. However, in COSC:

- The supervisor and co-supervisor (if any) of a student must be members of the continuing computer science graduate program committee (CCSGPC) listed on pages 2 and 3.
- A co-supervisor from outside the CCSGPC must be pre-approved by the graduate program coordinator.
- Other supervisory committee members can be from the CCSGPC or other CMPS members (no pre-approval or voting required). Anyone outside of CCSGPC and CMPS needs the pre-approval of the graduate program coordinator.
- Two members of the student supervisory committee (supervisor+co-supervisor_other committee members) must be from the Computer Science discipline (COSC).
- If the supervisor or co-supervisor are from the limited term CCSGPC list, the other co-supervisor must be from the COSC discipline.
- Either the supervisor or co-supervisor of a PhD student must be from the COSC discipline.
- Any exceptions to these rules can be discussed with the program coordinator to obtain a pre-approval on a case by case basis.

THESIS PROPOSAL EXAMINATION COMMITTEES

The thesis proposal examination committee consists of the student supervisor committee.

MASTER'S THESIS OR DOCTORAL DISSERTATION EXAMINATIONS

All examinations will follow the policies and guidelines of the College of Graduate Studies.