

GRADUATE STUDIES

COMPUTER AND SOFTWARE ENGINEERING

The Department of Computer and Software Engineering offers a wide variety of programs with the goal of allowing anyone who so desires to deepen and expand their knowledge in the field of computer science but also to train researchers who will be able to pursue a research career in industry, research centers or in academia.

RESEARCH AREAS

Software Engineering and Analytics

Software engineering includes the requirements study, choice of architecture, detailed design, construction, commissioning, operation and maintenance of software. Software analytics involves the acquisition, modelling, analysis and visualization of empirical data regarding different software procedures and artefacts that stem from these proceedings in order to clarify software engineering decisions.

Cyber security and Computer Systems Reliability

Cyber security unites a wide range of interests. It includes malware study and the reinforcement of computer systems against them, critical infrastructure security, defence strategies against cyber-attacks, cyber-investigation matters and information and private life protection.

Computational Medical Imaging

This interdisciplinary field uses the power of images and information processing to help medical personnel to accurately diagnose and optimize surgical procedures. In CSE, the researchers in this field collaborate closely with teams of radiologists, surgeons, oncologists and ophthalmologists.

Mobile and Cloud Computing

This research area deals with mobility management as well as sharing and distribution of storage and data processing resources through machine networking. It makes it possible to organize, store, and process this information across the planet.

Multimedia and Digital Entertainment

Multimedia and digital entertainment includes subjects such as audio and video data representation and processing, human-machine interface, virtual and augmented reality, intelligent, real time and distributed systems.

Data Science and Artificial Intelligence

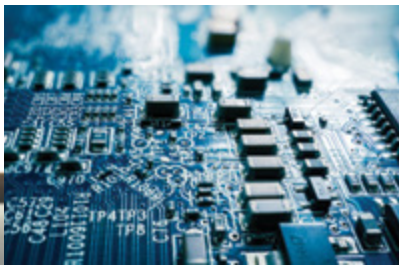
This area focuses on the study, analysis and design of computer systems for data and metadata analysis as well as smart systems resembling humans by their behaviour, their ability to learn and adapt, their methods of communication and decision-making abilities. It includes natural language processing, data visualization, information research and artificial vision. The systems developed can be applied to problems related to smart cities, transport (autonomous vehicles), decision-making in businesses and document analysis as well as the processing of images and videos.

Cyber-physical and Embedded Systems

Cyber-physical and embedded systems regroup computer hardware and software to interact with each other and the world that surrounds them. This highly interdisciplinary field includes surveillance and medical intervention systems, smart city, autonomous vehicles and robot systems.

COMPUTER AND SOFTWARE ENGINEERING AT THE CENTRE OF EVERYTHING

Today's world is a world of information and interdisciplinarity in which computing is omnipresent: on our smartphones and computers, in our cars and public transport, in our communication centres, in industries and in every facet of entertainment. Graduate studies in computer and software engineering thus seek to place the student at the centre of this interdisciplinarity in order to train specialists in the management, organization, processing and communication of this information.



UNITS AND RESEARCH INFRASTRUCTURES

Research Chairs

The Department offers a unique environment in Canada with its specialization in Computer Engineering and in Software Engineering. It is supported by the main Canadian and Québec granting councils, research chairs in particular :

- Canada Research Chair in Medical Nanorobotics, directed by Prof. Sylvain Martel;
- Canada Research Chair in Software Patterns and Patterns of Software, directed by Prof. Yann-Gaël Guéhéneuc;
- Canada Research Chair in Software Change and Evolution, directed by Prof. Giuliano Antoniol;
- Canada Research Chair in Medical Imaging and Assisted Interventions, directed by Prof. Samuel Kadoury.

Laboratories and Research Groups

The department host many research laboratories. Its professors are also associated with other groups and research centers :

- DORSAL : Distributed Open Reliable Systems Analysis Laboratory - Prof. Dagenais;
- GR2M : Microelectronics and Microsystems Research Group - Profs. Bois, Boyer, Langlois, Martel et Nicolescu;
- GRSTB : Biomedical Science and Technologies Research Group;
- IGB : Institute of Biomedical Engineering;
- IVADO : Institute for Data Valorization;
- Laboratory of Computer Graphics and Virtual Reality - Prof. Ozell;
- LARIM : Mobile Computing and Networking Research Laboratory - Prof. Pierre;
- LITIV : Laboratory of Interpretation and Processing of Images and Video - Prof. Bilodeau;
- LIV4D : Imaging and Vision 4D Laboratory - Prof. Cheriet;
- MAGNU : Digital Meshing and Geometry Laboratory - Prof. Guibault;
- MCIS : Lab on Maintenance, Construction and Intelligence of Software - Prof. Adams;
- MIST : Making Innovative Space Technology Laboratory - Prof. Beltrame;
- OICRM : Interdisciplinary Music Creation and Research Observatory - Prof. Boyer;
- PolyData - Profs. Aloïse, Bilodeau, Desmarais, Gagnon, Hurtut, Pal and Pesant;
- QUOSSEÇA : Quebec Optimization and Satisfaction Strategies Exploiting Constraint Algorithms - Prof. Pesant;
- ReSMiQ : Quebec Strategic Grouping in Microsystems;
- SecSi Research Laboratory - Profs. Barrera and Fernandez;
- SOCCER : Software Cost-effective Change and Evolution Research Lab - Profs. Antoniol and Guéhéneuc;
- SWAT : SoftWare Analytics and Technologies Lab - Prof. Khomh;
- VERIFORM : Research Laboratory for Formal Verification of Real-time Systems - Prof. Boucheneb.

THE DEPARTMENT

- 33 professor-researchers;
- Almost 200 graduate students;
- 4 research chairs.

INFORMATION

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POLYTECHNIQUE
MONTRÉAL

WORLD-CLASS
ENGINEERING

