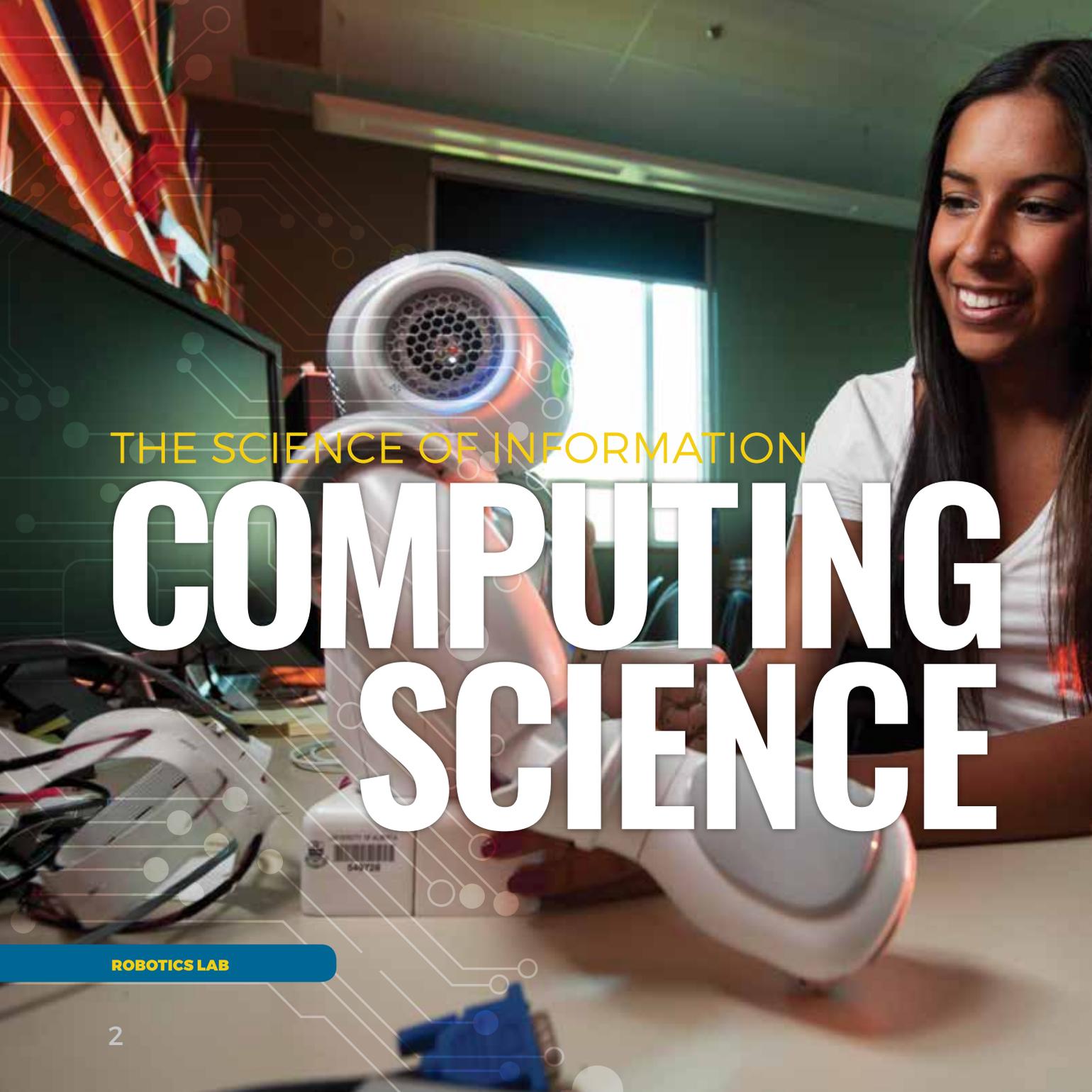


DISCOVER

**COMPUTING
SCIENCE**

GRADUATE
STUDIES



THE SCIENCE OF INFORMATION

COMPUTING SCIENCE

ROBOTICS LAB



INTERNATIONALLY RECOGNIZED

THE DEPARTMENT OF COMPUTING SCIENCE has an international reputation for excellence in the many fields of computing, both in foundations and applications.

We are known for our collegial atmosphere, dynamic and well-funded research environment, and superb research and teaching infrastructure.

As one of the top research-intensive computing science departments in Canada, this is an excellent place to pursue graduate studies.

WHAT SETS US APART?

OUR STUDENTS AND FACULTY are pioneers in research and education. Faculty and graduate students are constantly working to advance computing science by making important contributions to the field.

Our department is the oldest in Canada, and through our 50-year history we have celebrated great accomplishments including the following:

Our researchers in Artificial Intelligence have written the first programs to solve three of the world's most played games: Chess (Murray Campbell, 1997), Checkers (Jonathan Schaeffer, 2007), and Poker (Michael Bowling, 2015).

Our students frequently win prestigious awards for outstanding research, such as the International Joint Conference on Artificial Intelligence (IJCAI) Distinguished Paper award, one of the top awards in artificial intelligence, as well as CAIAC AI Doctoral Dissertation Award and the IBM research group of the year award.

Our students have placed highly in the ACM International Collegiate programming competition, been awarded the Governor General's Gold Medal for graduate student research, and won the Supercomputing Cluster Challenge.

WE HAVE "... country-leading grad student funding, a wealth of industry partners, and interesting research problems, but the best part is the people. Whatever the activity, whether working or socializing, the students and the faculty make this department feel like a community."

-MICHAEL SMIT, Computing Science PhD student



RESEARCH AREAS

SOLVING THE GAME OF POKER

PHD STUDENTS NEIL BURCH AND MICHAEL JOHANSON are members of the University of Alberta Computer Poker Research Group. This project aims to create computer programs that can independently learn in large domains, where they must cope with unknown information, random chance, and competitors.

In January 2015, their work got international media attention when they created a program, called Cepheus, that taught itself a perfect strategy for playing two-player limit Texas hold'em poker.



WHAT WE OFFER

WE OFFER MASTERS, COURSE-BASED MASTERS, AND DOCTORAL DEGREE PROGRAMS. The research areas listed below are very broad categories aimed at pointing you in a general direction according to your interests.

Because of the interdisciplinary nature of Computing Science, many of our research groups will fall under more than one research area.

Visit [CS.UALBERTA.CA/RESEARCH](https://cs.ualberta.ca/research) for further details, opportunities, and contacts.

OUR RESEARCH AREAS INCLUDE:

- Advanced Man-Machine Interfaces
- Algorithmics
- Artificial Intelligence
- Bioinformatics
- Communication Networks
- Computer Games
- Computer Graphics
- Computer Vision & Multimedia Communications
- Database Systems
- Machine Learning
- Reinforcement Learning
- Robotics
- Software Engineering
- Software Systems

INTERDISCIPLINARY

INTERDISCIPLINARY RESEARCH is important and many of our faculty members have diverse interests ranging from cognitive science to medical informatics. We have current collaborations with the Canadian Space Agency, the Cross Cancer Institute, the U.S. Food and Drug Administration (FDA), hospitals, other University of Alberta faculties and more.

We also have adjunct professors from the departments of Psychology, Philosophy, Pharmacology and the Faculty of Engineering.



OTHER SPECIALIZATIONS

3D UNDERWATER CAMERA FOR OCEAN NETWORKS CANADA

THE WORLD'S FIRST MULTI-PROJECTOR, multi-camera, 3D imaging system, was developed by Xida Chen (PhD Student), Steve Sutphen (Faculty Service Officer), and Herb Yang (Professor) in our department. It is currently deployed in Saanich Inlet, B.C., where it monitors the undersea habitat and uploads the collected data, making it accessible to researchers around the world.

Photo courtesy of **OCEAN NETWORKS CANADA**



OTHER SPECIALIZATIONS

IN ADDITION TO THE RESEARCH AREAS LISTED, there are opportunities to explore a graduate specialization in Statistical Machine Learning (a joint program with Mathematical and Statistical Sciences) as well as a course-based MSc with a specialization in multimedia.

STATISTICAL MACHINE LEARNING SPECIALIZATION

The MSc and PhD degrees in Statistical Machine Learning may be taken jointly in the Department of Computing Science and the Department of Mathematical and Statistical Sciences.

The program emphasizes the theoretical aspects of the design and analysis of machine learning algorithms using tools of statistics and computer science.

MULTIMEDIA MASTERS PROGRAM

Multimedia-related research and development have evolved rapidly in the last two decades as the result of technological advances in hardware, software, and network infrastructures.

While images and videos continue to play a key role in the multimedia pipeline, the latest dynamic and multi-modal data generated from motion capture, smart sensors, multi-views, haptic devices, 3DTV, etc., have added new challenges in efficient multimedia processing, task scheduling, real-time mobile communications, multi-screen and multi-stream synchronization, human computer interaction, big data retrieval, mobile display optimization, and so on.

With these current and rapidly advancing technologies in mind, the Multimedia masters program is designed for providing a broad coverage of material, as well as more in depth knowledge in selected hot topics which are associated with practical projects.

WE ALSO OFFER GRADUATE PROGRAMS IN COOPERATION WITH THE FACULTY OF ENGINEERING (MINT) AND THE FACULTY OF ARTS (HUCO).

Master of Science in Internetworking (MINT)

Master of Arts in Humanities Computing (HUCO)



HOW WE STAND OUT

WORLD-LEADING FACULTY

OUR FACULTY CONSISTS OF INTERNATIONALLY RECOGNIZED LEADERS in areas that span the complete spectrum of modern computing science and enjoys collaborative research partnerships with local, national, and international institutions and companies.

MICHAEL BOWLING, Professor - Artificial Intelligence, Computer Games, Reinforcement Learning and Robotics.

FACILITIES

THE DEPARTMENT HOUSES 18 RESEARCH LABS, including 3 highly specialized research centres:

The Alberta Ingenuity Centre for Machine Learning (AICML) is a world-class centre dedicated to fundamental research, advancement and application of machine learning in the health, finance, energy, and environment domains.

The Centre for Intelligent Mining Systems (CIMS) works on exploratory research in intelligent systems for the oil sands mining industry.

The Multimedia Research Centre (MRC) studies online multimedia education, 3D modeling and visualization, human perception and human computer interaction, medical related projects, multimedia transmission, and multimedia art/image processing.

FUNDING/SCHOLARSHIPS/AWARDS

THERE ARE VARIETY OF FINANCIAL SUPPORT options and awards available to both Canadian and international students, including the Natural Sciences and Engineering Research Council of Canada (NSERC) top-ups, departmental research awards, U of A scholarships, and more.

TEACHING AND RESEARCH ASSISTANTSHIPS

EACH YEAR, THE DEPARTMENT OF COMPUTING SCIENCE offers financial support to full-time thesis based students entering the graduate program through a combination of teaching assistantships, research assistantships or scholarships.

These are designed to cover the cost of tuition and living expenses in Edmonton and are available to MSc students for up to two years and PhD students for three or four years. Additional summer support may also be provided.



COMPUTING SCIENCE GRADUATE STUDENTS' ASSOCIATION
UACSGSA.BLOGSPOT.CA

STUDENT SUPPORT

WE OFFER A SUPPORTIVE LEARNING ENVIRONMENT for our students. We have an international and diverse community, and offer department funded visits to exceptional applicants.

Our graduate students have access to the following:

- A superb research environment
- Flexibility in choosing a supervisor and a research area
- Opportunities for interdisciplinary studies
- Interaction with industrial organizations and academic experts, both within and outside their chosen discipline
- Research involvement that intensifies through the course of the program

STUDENT ORGANIZATIONS

COMPUTING SCIENCE GRADUATE STUDENTS' ASSOCIATION

The CSGSA is the representative voice of graduate students within the Department of Computing Science and acts as a point of communication between students and the department. This involves creating communication channels to the department and bringing in graduate students' interests in departmental decisions. The CSGSA also organizes all-inclusive social activities and events that are open to graduate students, staff, faculty, visiting scholars, and others in the department.

Activities include monthly klatches, socials, movie nights, an annual fall BBQ, Pi Day, Chinese New Year, Persian New Year, and other cultural celebrations. CSGSA also manages the graduate students' office spaces and facilitates teaching assistant workshops at the beginning of every academic year. The CSGSA is committed to strengthening the relationships between graduate students and the rest of the university. This includes active collaboration with entrepreneurial incubators such as eHub and Mitacs, the organization of academic mixers, and the management of publicly available job banks.

DISCOVER COMPUTING SCIENCE

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UNIVERSITY OF ALBERTA
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