

Message from the Chair

Here in the Department of Computer Science at the University of Toronto, we place tremendous value on our relationships with industry and the business community. Ongoing communication, collaborations and partnerships with industry are vital to the success of our teaching and research missions.

Strong ties with industry shape our activities in a variety of ways.

Academic researchers—our faculty, research associates and students—learn more about the pressing problems facing

industry in ways that can inform their research programs and lead to fertile academic-industry collaborations. Graduate students learn about a variety of research methodologies beyond the purely academic. As a department, we are best served by embracing the entire spectrum of research activities from curiosity-driven to applied, and ensuring that communication occurs across the spectrum.

Continuous interactions with industry also inform the development of our curriculum so that we can better meet the needs and desires of our undergraduates. Internships through programs such as our Professional Experience Year (PEY) enrich the educational experience of our students in a way that cannot be matched in any classroom or university laboratory.

We are proud of our deep connections with the industrial and business communities, but are always striving to do more. I encourage potential partners to explore the breadth and depth of the internationally renowned research in DCS, and benefit from our expertise, creativity and drive.

Craig Boutillier
Professor & Chair

“Our relationship with the University of Toronto has given us access to many of the bright young minds in the field. Not only does our growth depend on an ability to locate new talent, but the sheer quality, attitude and overall cultural fit of these graduates has always been a welcome surprise to us. Our company would not have been nearly as successful as it has been without them.”

JEREMY CHAN, PRINCIPAL
THE JONAH GROUP

Computer Science at the Uoft

Founded in 1964, the Department of Computer Science (DCS) is the oldest in Canada, and one of the top-ranked departments internationally. Our faculty have been honoured by distinguished prizes such as the Turing Award, the Fulkerson Prize in Discrete Mathematics, the IJCAI Award for Research Excellence, the Gödel Prize, the Order of Canada and the David E. Rumelhart Prize. We are home to more than 60 faculty members, 300 graduate students and 800 undergraduates. The extent and strength of research at UoFt allows us to engage in interdisciplinary research areas as diverse as computational biology, linguistics, neuroscience and finance.

Why Partner with DCS?

Expand your commercial horizons – be the first to learn about the latest developments in computer technology

Network with the experts – be linked to the best research minds in the world

Connect to the largest university in Canada – gain access to state-of-the-art facilities and technology

How to Get Involved

Research partnerships – create contract partnerships and grants with DCS; advance the field of computer science by bringing your company’s unique perspective to what we do

Student internships – engage our students before your competitors do; opportunities include the Professional Experience Year Program, graduate student internships and summer jobs

Endowments and Sponsorships – support the academic community; make a difference by strengthening our resources and supporting the next generation of world-class researchers

Together, we will continue to build the city of Toronto as a leader in high technology.



Contact Us

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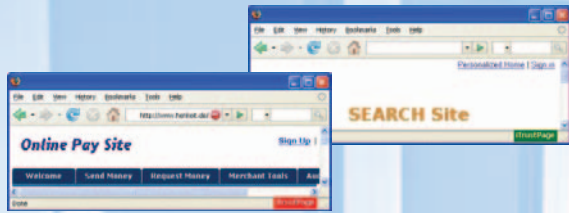
RESEARCH IN ACTION

Department of Computer Science



Collaboration.
Innovation.
Discovery.

DEPARTMENT OF COMPUTER SCIENCE RESEARCH HIGHLIGHTS

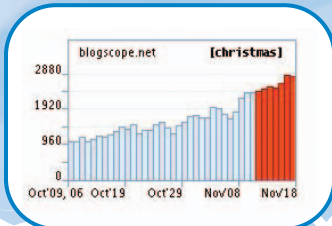


▲ The **iTrustPage** provides a means by which phishing sites are exposed as “untrusted.” As spam continues to be a real issue (costing the US economy \$1 billion in 2005) and threatens the credibility of the internet as an e-commerce platform, this technology is only becoming more important.

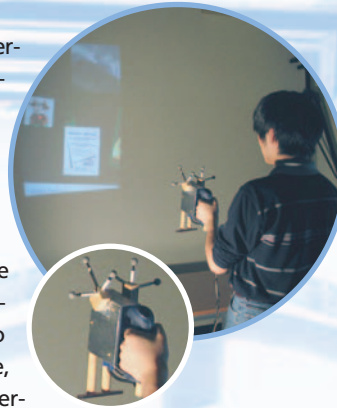


◀ The **volumetric display**, now a working and commercially available technology, is a visually stunning research project. The device generates true volumetric 3D images by actually illuminating points in 3D space, allowing viewers to use their inherent physiological mechanisms for depth perception to gain a rich understanding of the virtual 3D scene. The displays usually have a 360° field of view, and those observing do not need to wear hardware to appreciate the images produced.

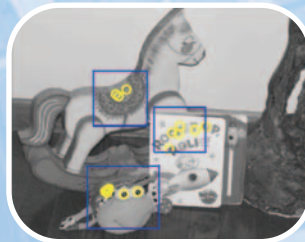
▼ Another innovation at DCS is the **BlogScope**, a feature-rich search engine for blogs. The tool helps the user discover knowledge from blogs by providing hints in the form of bursts and correlations. All search results are accompanied by a popularity curve for the query; bursts on the curves are marked in red. BlogScope draws out and identifies interesting information from the millions of blogs found on the web.



➤ The Human-Computer Interaction group has been developing a **handheld projector**, using a Mitsubishi pocket projector to prototype the design of different interaction techniques and application scenarios. This research explores the possibility of embedding a projector into handheld devices to project information anywhere, creating a large display and interaction space.



✳ The Numerical Analysis group has studied several problems in computational finance over the past decade. One that they have looked at recently is **modelling complex financial instruments**, specifically, the pricing of “collateralized debt obligations” (CDOs). The market for CDOs has grown rapidly to over US\$1 trillion annually in 2006, since the appearance of JP Morgan’s Bistro deal, the first synthetic CDO, in December 1997. However, there are still many open problems associated with the pricing and hedging of these complex financial instruments.



◀ Researchers at DCS have also engaged in a project on **Learning to Automatically Annotate Images from Captioned Training Data**. They have created a system that automatically learns to detect and name individual objects from a set of captioned images of object collections. This technology could help a user annotate or simply sort their home photo collections into categories, after having learned such categories from prior user annotations. In the image shown top left, the system has correctly detected the toy objects ‘horse,’ ‘rocket’ and ‘bug,’ using collections of local interest points.

➤ Another of our research projects explores **map learning from images**. This system automatically creates maps of an environment based on landmarks learned from images taken during excursions through it. Pictures are taken from similar positions and oriented to a novel test image, despite potentially different appearances due to transient effects such as cars, pedestrians and lighting variations. The system is able to correctly match a test image to some stored images, making this useful as an aid for a lost tourist, or for robot navigation.



➤ Another research project attracting interest has been on **Pressure-Based Pen Interaction**. DCS has originated novel interaction techniques that make use of the pressure sensed by a pen on modern tablet computers. This project also gives users the ability to adjust and manipulate arbitrarily high-precision parameters in the interface.



▼ The **i* modelling language** was developed to help organizations understand the rationale for introducing new computer systems. The language is part of a requirements analysis method developed by researchers in the software engineering group. Using i*, an analyst can model the goals of all stakeholders involved in specific business activities, and coordinate how people depend on one another to achieve their goals. The models are used to analyze the impacts of automation, and to help explore different technological solutions to business problems.

