INSTITUTE FOR COMPUTING, INFORMATION AND COGNITIVE SYSTEMS •I•C•I•C•S•

FOCUS

THE UNIVERSITY OF BRITISH COLUMBIA

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Enhancing E-Commerce Experiences

Commerce professor and ICICS member Izak Benbasat is exploring ways to improve communication between humans and computers in corporate and e-commerce environments.

- **Human–computer Interfaces**
- **Business-to-consumer E-commerce**
- **Intelligent Support Systems**

In the bustling cyber-world of online shopping, it is no longer enough to have a flashy, easy-to-navigate website. While speed, accuracy and security of transactions are still crucial design features for any e-business, how a company communicates with people is becoming equally important. Today's e-shoppers are a savvy, sceptical and growing market. Izak Benbasat, Canada Research Chair in Information Technology Management, believes that companies should complement their transactional activities with relationship-enhancing ones, such as improved product description and service, customer trust and positive company image.

Avatars at Your Service

Any retailer knows that providing good service is crucial to building relationships with customers. Online shopping is no exception, and e-shoppers have indicated a need and preference for some kind of human contact.

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ICICS Director's Corner

ICICS' growth spurt shows no signs of slowing down! In this edition of FOCUS, we introduce you to fifteen recent members in a special fold-out section. The four researchers we profile highlight the innovation and outreach ICICS members excel at.

Gary Birch's position as head of the Brain Interface Lab at the G.F. Strong Rehabilitation Centre keeps him focused on practical results in his research. Gary hopes to improve the quality of life for those living with assistive devices through his work on self-paced brain interfaces.

The commonalities between problems drives Canada Research Chair Kevin Murphy's machine learning research. The probabilistic models he uses to abstract meaning from massive amounts of data have application in both robotic vision and bioinformatics.

Commerce professor Izak Benbasat's research shows that online consumers are looking for an e-commerce experience as informative, responsive, and socially fulfilling as traditional shopping can be. The customer-service interface he is developing to accomplish this will also have a place in corporate communications.

E-commerce will benefit from the middleware that Eric Wohlstadter of Computer Science has developed to handle the policy requirements of different applications within web-based systems. Eric is also working on a language that will automate rule-checking in programming and save developers a lot of time.

We hope you enjoy this edition of FOCUS.

Rabab Ward, ICICS Director

Benbasat: ***Continued from page 1***

Benbasat and colleagues have been investigating methods to improve service and product recommendation systems by incorporating text, speech, text-to-speech conversion, and humanoid avatars representing sales assistants into a Web interface. They are examining issues such as trust, social presence (the degree to which you feel the person with whom you are communicating is there with you) and telepresence, or the feeling that you are in another environment, such as a store represented on the Web. Their findings are not surprising. Humans still prefer a live human voice, which is the most costly method of providing customer service and advice. Text-based systems were the next preferred method and text-to-speech systems the least preferred, presumably because they sounded artificial. The addition of a "talking head," or three-dimensional avatar representing a sales assistant, actually augmented all interactions and increased the sense of social presence.

Designing Benevolent Agents

The challenge in designing virtual advice systems is not just to provide good information, but to understand affect, or the emotional response of the shopper. There can also be incongruence in design goals between generating higher traffic and sales for the e-vendor and designing a recommendation agent (RA) that is perceived by the customer as being competent, benevolent and honest—all dimensions of trustworthiness. "A lot of people have difficulty ascribing these human-like characteristics to a piece of software," admits Benbasat. He and his colleagues developed an explanation mechanism that allows RAs to communicate information in order to enhance users' trust and beliefs. For digital camera purchasers, they found that an RA that provided explanations about how it reasons and asked questions that focused on customers' needs (such as how often the person wished to take pictures of objects far away), was perceived as being more trustworthy than one that asked about product attributes alone (such as the power of zoom one wished the camera to have). However, the improvement in the level of trust was only ten to fifteen percent. "There are many ways to improve these trusting beliefs," Benbasat notes. "If you have a properly designed agent, people will use other mechanisms in the absence of explanations." Benbasat's ICICS and Sauder School of Business colleagues include Hasan Cavusoglu, Ronald Cenfetelli and Jai-Yeol Son.

Online Shopping and Virtual Community Building

An increasing number of e-retailers are tapping into the psychology of online consumers by designing their sites as virtual meeting places, where like-minded consumers can exchange comments, ideas and product reviews. The exponential proliferation of blogs, both private and corporate, reveals the extent to which people want to interact online, as well as perform transactions. Benbasat is studying the effects of personalization, where a retailer like Amazon.com might recommend items based on a customer's prior purchases and online behaviour. "When you feel that the website is reacting to the products you are perusing and trying to understand your needs, it is a type of personalization that creates a higher social presence," says Benbasat. Similarly, a website that provides consumer reviews creates a perceived social presence as well as useful product information. Together these aspects significantly affect customer loyalty. "Shopping is both a cognitive activity and a social activity, and when you buy a product both instrumental reason and affect are involved. So we are trying to capture all of these factors in our work."

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Perfecting Neural Control of Assistive Devices

New ICICS member Gary Birch is advancing brain interface technology to improve the design of assistive devices for people with physical disabilities.

- **Brain Interface Technology**
- **Assistive Devices**
- **Asynchronous Control**

For over thirty years, Gary Birch has been living without the use of his legs and with limited use of his arms and hands. A car accident severed his spinal cord the summer that he graduated from high school. Over 1,000 people a year suffer from spinal cord injuries in Canada. Others suffering from neuromuscular and other degenerative diseases have a similar loss of function and motor control. Gary Birch's tragic experience motivated him to become one of the world's top researchers in brain interface technology and assistive devices. He started his career at UBC, earning a BA Sc and then a PhD in Electrical Engineering in biomedical signal processing in 1983. Birch is now executive director of the Neil Squire Society, adjunct professor in Electrical and Computer Engineering at UBC, and head of the Brain Interface Lab at G.F. Strong Rehabilitation Centre.

"What really makes our group unique is that we work on a day-to-day basis with people who have all kinds of disabilities," says Birch, who collaborates with ICICS colleagues Rabab Ward and Peter Lawrence, both from ECE. "Since our investigations are rooted in the real world, we take a practical approach to research problems." Birch's work in assistive technologies goes beyond signal processing to encompass wireless technologies and human–computer interaction. "I am interested in any technology that can enable people with disabilities to better participate in the home, at work, or in recreational activities," he says.

"A lot of work has been done by people who don't have a background in assistive technology or a connection with the end user, so they tend to come up with very artificial environments."

Gaining Asynchronous Control

The technology that Birch and his lab have developed is a brain-controlled switch that detects brain signals as patterns in a user's electroencephalograms related to imagined movements. These signals are measured by EEG sensors attached to the scalp. Previous brain interface (BI) research has focused on synchronized control devices, where the system dictates control. When a synchronized BI system is turned on, the user is regularly prompted for input and only allowed to control the assistive device during specific periods. Synchronous systems only provide control intermittently, and not necessarily when the user intends it.

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Dynamic Matchmaking—Bridging the Software Policy Gap

Computer scientist Eric Wohlstadter is a middleman of software engineering. He develops techniques to facilitate component reuse, crosscut between software languages and systems, and improve design rule checking.

- **Adaptive Middleware**
- **Policy Matchmaking**
- **Design Rule Optimization**

In the dynamic world of software development, particularly for web-based services that are distributed over the Internet, one of the major challenges is the communication between software components from different systems. For example, an online retailer and a credit card service provider each have different policies—or QoS requirements. The credit card provider's policy might focus on security and privacy, while the online retailer is interested in functional policies such as shipment and delivery. The business-to-business web of a single e-commerce transaction could involve a company such as Amazon.com and several different services providers, such as shippers or credit card companies. In the space of a few minutes, we can place an online order, have the transaction completed and know the delivery date—all seemingly done with an ease and simplicity that belies the complexity of communication between layers of software components in different systems.

GlueQoS—Middleware "Sweetener" and Policy Matchmaker

Middleware is software that connects two otherwise separate applications, such as two different types of databases, or two sides of an application, such as clients and database server. Policy matchmaking and enforcement over dynamic web-based systems are key features of the GlueQoS middleware that ICICS member Eric Wohlstadter has developed with members of the Advanced Enterprise Middleware group at IBM Research. In most current types of policy middleware, the business client (such as Amazon) would be asked to fulfill certain requirements (such as entering a password) to log on to the server system, but would have no way of expressing its needs (fulfillment rate, shipping, etc.).

The "sweetening" power of GlueQoS is both dynamic and even-handed. "The dynamism of our middleware is the ability to monitor policies to ensure they are enforced," says Wohlstadter. "The symmetry allows both client and server needs to be resolved in policy matchmaking." His work is currently being funded by MacDonald Dettwiler & Associates.

Playing by the Rules

Every programming language has a set of rules that must be followed in order for the program to execute. In addition, individual companies or software development teams have their own programming rules which don't come with "off-the-shelf" programming languages such as Java or C++.

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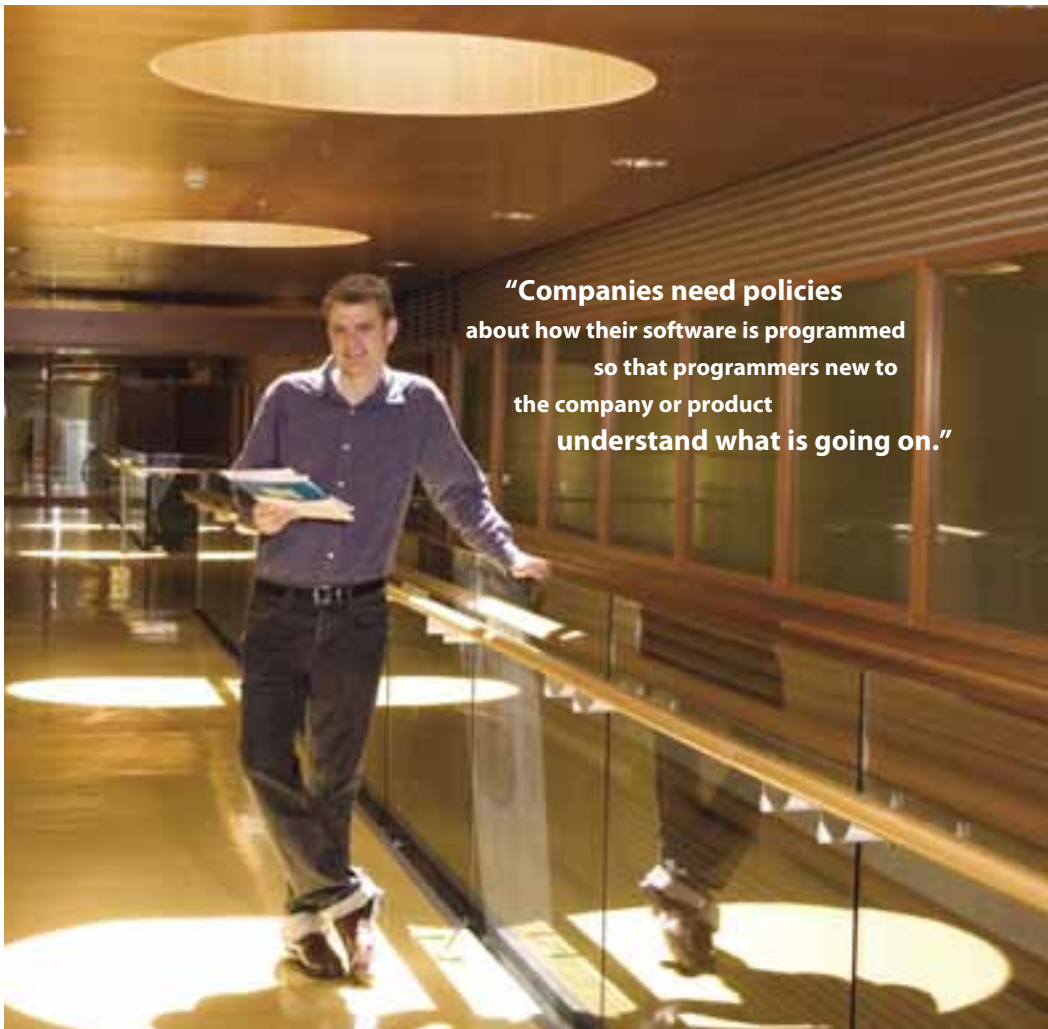


Fifteen Recent ICICS Members

We welcome 15 outstanding researchers to ICICS. Watch for more about their work in this and upcoming issues of FOCUS.

Gary Birch
Neil Squire Foundation/ Electrical and Computer Engineering
(See profile on page 3)

Karen Cheung
Electrical and Computer Engineering
Research: Biomedical Microsystems.

"My research focuses on bioMEMS (bio Micro-Electro-Mechanical Systems) for both therapeutic and diagnostic applications. In the near future, implantable microelectrode arrays may be used for the neural control of prosthetic limbs, and it will be crucial to improve the biocompatibility of these implants. In another project, I will investigate on-chip cell culture within microfluidic systems for hands-free, efficient monitoring and characterization of cells. Such a system will lead to more sensitive, more efficient, and cheaper diagnostics and drug discovery. I look forward to collaborating with ICICS members Professor Boris Stoeber on microfluidics projects, and Professor Konrad Walus on a cell patterning project."

Edmond Cretu
Electrical and Computer Engineering
Research: Advanced Microsystems and Smart Sensors.

"Two dominant directions mark the present engineering world: the diffusion of information technology into almost every facet of modern life, and the micro/nano-miniaturization of engineering systems. My research originates from the blending of these two aspects, and targets advanced microsystems and smart sensors, where one can take advantage of the combination of microstructures and advanced signal processing algorithms. A major theme of "macro-engineering at microscale" is the functional integration benefits resulting from the tight (nonlinear) coupling between multiple energy fields (e.g., mechanical and electrical) at small scales. These benefits include both the improvement of the performance of existing devices (for instance, highly sensitive accelerometers), and the generation of completely new applications, such as real-time mechanical spectrum analyzers. Neuromorphic engineering, and learning and using some of the mechanisms devised by nature, together with nonlinear signal processing, are also placed high on my list of research interests. The interdisciplinary character of ICICS and its philosophy and mission, make me more than enthusiastic; ICICS affords rich collaborations, especially related to biomedical applications."

Thomas Froese
Civil Engineering
Research: Advanced Information and Communications Technologies (ICT).

"I work in the area of advanced information and communications technologies for the architecture, engineering, construction, and facilities management (AEC/FM) industries. AEC/FM works, such as buildings or public infrastructure, are large, complex, and information-sensitive projects that bring together many people from different companies and disciplines to collaborate for short durations on one-of-a-kind ventures. My work helps to provide the information infrastructure to support new ICT in AEC/FM. I have contributed to the data standards that allow the major software applications used in the industry to share project information. I have also co-founded a company offering online project collaboration services for construction projects, and I am working to develop project information management as a sub-discipline of construction project management. This work supports an ICT trend that is leading to faster, cheaper, and better construction. I look forward to the collaborations that ICICS makes possible."

Dana Grecov
Mechanical Engineering
Research: Non-Linearities and Multiple Length Scales.

"I'm using theory and computations to understand problems in which non-linearities and multiple length scales give rise to complex behaviour. These problems bring together ideas and theories for a variety of disciplines in science and engineering, which is why I'm very happy to be collaborating with ICICS members. These ideas and theories include non-Newtonian fluid mechanics, numerical simulation, computational fluid dynamics, rheology of complex fluids, and computational material science. My current research work focuses on the simulation of visco-elastic lubrication, multiscale process modelling of liquid crystalline materials, bio fluid mechanics, and the simulation of industrial processing flows."

Xiaodong Lu
Mechanical Engineering
Research: Mechatronics, Electro-mechanical Systems, Precision Machine Design.

"My research interest is to design ultra-precision instruments and machine equipment capable of handling nanometric motion with high speed, high stiffness, and high accuracy. To achieve this, I'm working towards the integration of electro-mechanics, precision machine design, structural dynamics, electronics, real-time computer design, signal processing, estimation, and advance control algorithms. Currently, my ICICS research group focuses on three projects: ultra fast tool servos for fabricating 3-D patterns with sub-nanometer resolution; next generation scanning probe microscopes for fast scanning of large samples; and active spindles with nanometer accuracy for precision manufacturing and metrology."

Kevin Murphy
Computer Science
(See profile on page 7)

Robert Pritchard
UBC School of Music
Research: Electroacoustic and Computer Music.

"I am a composer, theorist and a specialist in electroacoustic and computer music. I belong to the research group Music, Sound and Electroacoustic Technologies (MuSET), dedicated to the exploration of computer applications to music and sound. I'm developing interactive tools for gesturally controlling the processing and synthesis of sound, speech and music in performance. Currently, I'm concentrating on speech synthesis and diffusion methods controlled by Cybergloves and position trackers, but over the next year this gestural control work will be expanded to include video processing and servo motor control, allowing artists to perform in real-time within a highly integrated multimedia environment."

Sheryl Staub-French
Civil Engineering
Research: Cost Estimating, Design for Constructability, Computer-Integrated Construction, Feature-Based Product Modelling.

"My primary research interests include activity-based cost estimating, constructability reasoning, and feature-based product modelling. Activity-based cost estimating focuses on developing, implementing and testing theories to represent how features of building product models affect construction activities to support cost estimates. Constructability reasoning investigates facility designs. Recognizing constructability issues early in a project's delivery process helps identify design constraints which limit a contractor's ability to plan and perform construction operations effectively. Specifically, my work focuses on developing and testing computer-based models to simulate constructability reasoning and predict problems. Finally, feature-based product modelling creates representations from the construction perspective. This has led to the formalization of a computer-interpretable vocabulary using the concept of features to represent the different design conditions that affect construction costs and constructability."

Leo Stocco
Electrical and Computer Engineering
Research: Medical Robotics, Haptic Interfaces, Electro-mechanical Optimization.

"My past research has focused on mechanical robot optimization, human–computer interfaces, and most recently, surgical robots. Advances in medical devices help surgeons to improve surgical outcomes and shorten recovery times. The introduction of robotics into total hip and knee replacement surgery eliminates the need for bone cement, thereby extending the life of the implant indefinitely and opening the door to minimally invasive procedures and anatomical corrections that are not possible using conventional methods. My future research activities involve computer graphics and intelligent medical devices. I plan to collaborate with ICICS member Dr. Tim Salcudean of ECE in the near future."

Boris Stoeber
Mechanical Engineering & Electrical and Computer Engineering (joint appointment)
Research: Micro-Electro-Mechanical Systems (MEMS), Microfluidics, and Sensor Technology.

"My research focuses on the broad area of Micro-Electro-Mechanical Systems (MEMS), including microfluidics, sensor technology, micro-optical systems and actuators as well as microsystem integration for biomedical applications and for environmental control. My current research work on microfluidics involves flow physics of complex microflows including concepts for flow control in microfluidic devices, new strategies for laminar mixing and investigations of visco-thermal flow instabilities. The interdisciplinary aspect of MEMS research has allowed me to establish several ICICS collaborations on these topics."

Eric Vatikiotis-Bateson
Linguistics
Research: Auditory-Visual Speech Processing.

"My research focuses on auditory-visual speech processing. I look at the linkage between the production and perception of multimodal speech behaviour. New experimental and measurement techniques are being developed for recording and analyzing spoken communication in natural settings, both inside and outside the laboratory. Key to this development is the perfection of a non-invasive, video-based measurement system that can be used anywhere that face video can be recorded. Specifically, I'm researching computational modelling of audiovisual speech production. I'm also looking at the dependencies between observable measurement domains, such as the brain, vocal tract, voice source, face, and head. In addition, I'm involved in several exciting collaborative projects within ICICS."

Carlos E. Ventura
Civil Engineering
Research: Earthquake Engineering, Structural Dynamics, Instrumentation and Testing of Structures.

"My research work is on earthquake engineering, structural dynamics and modal testing. My main interest is evaluating the dynamic behaviour of structural systems subjected to extreme dynamic loads, such as earthquakes and blast loads. This includes experimental studies in the field and in the laboratory of structural systems and components. I have developed novel techniques for regional estimation of damage to structures during earthquakes, and conducted detailed studies on nonlinear dynamic analysis of structures and methods to evaluate the dynamic characteristics of large Civil Engineering structures. My current research includes the development of performance-based guidelines for the seismic retrofitting of schools. I'm also studying methods to evaluate the interaction between critical infrastructures vulnerable to natural and man-made hazards, and working on structural health monitoring of bridges."

Konrad Walus
Electrical and Computer Engineering
Research: Nano Devices and Circuits.

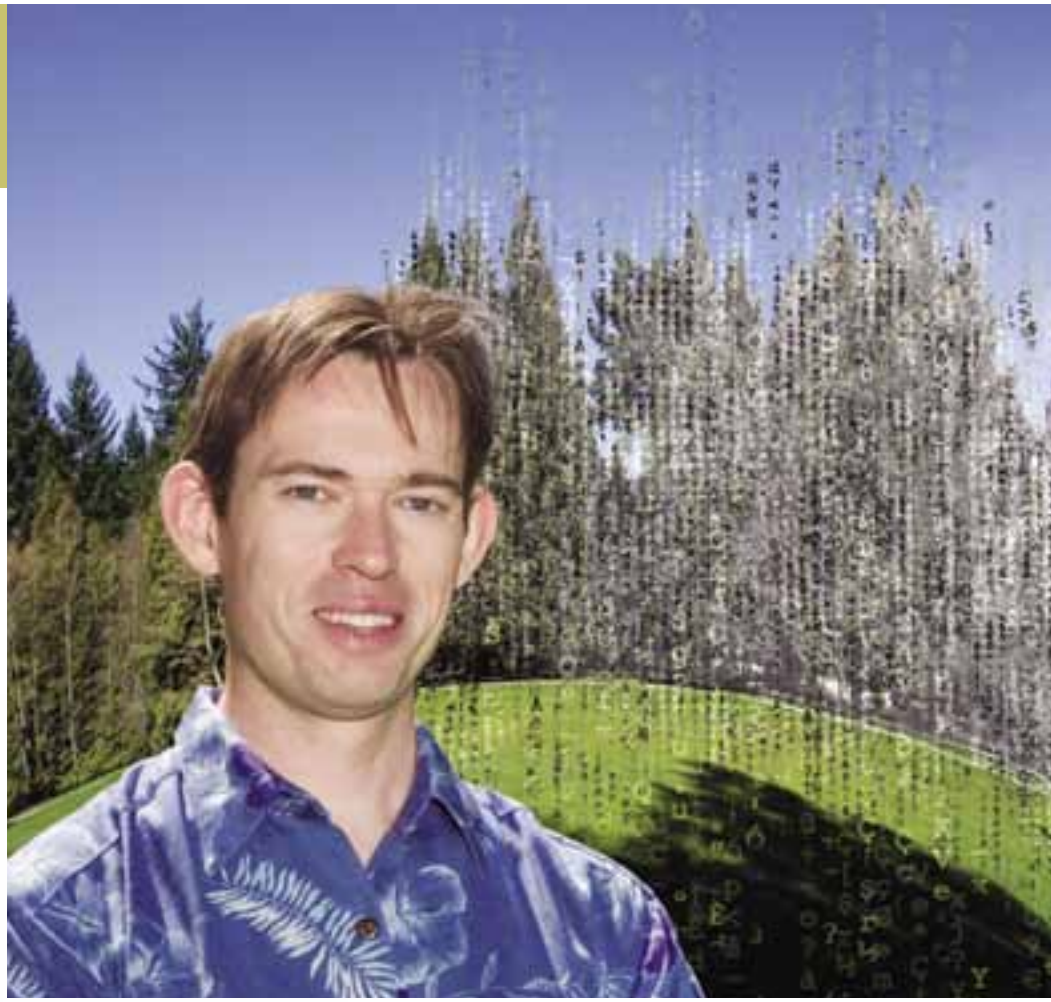
"My recent work has studied the future potential of an emerging computing paradigm, called quantum cellular automata (QCA), which is implemented using coupled quantum dots in single molecules. QCA is attractive because it enables computing using molecular devices that do not require individual external connections; information processing using QCA requires only the electrostatic interactions between QCA devices. Currently, I am working with ICICS members Drs. Lucas Chrostowski, to develop a method for optically clocking QCA circuits, and Andre Ivanov, to develop strategies for efficient testing of QCA circuits. My other research interests include printable organic devices, for which I have teamed up with ICICS researcher Dr. John Madden, to develop an experimental printing system for implementing these circuits."

Eric Wohlstadter
Computer Science
(See profile on page 4)

Decoding a Deluge of Data

Computer scientist and statistician Kevin Murphy employs machine learning and probability theory to develop artificial systems that can make abstract interpretations from low-level data.

- **Machine Learning**
- **Probabilistic Graphical Models**
- **Computer Vision**



"Computers are good at arithmetic and bad at understanding images, and people are the other way around," says Kevin Murphy, new ICICS member and Canada Research Chair in Machine Learning and Computational Statistics. He is interested in bridging the gap between current machine learning abilities and human abilities of finding and understanding patterns in data.

One advantage that people have that machines do not is prior experience. People learn to solve many related tasks during their life, so when they are faced with a new challenge for the first time—such as recognizing a new kind of vehicle—they are able to rapidly learn from a small number of examples. In contrast, in most current machine learning techniques, the computer starts out as a "tabula rasa," and requires a large amount of data to learn anything.

Object Recognition: Seeing the Forest before the Trees

One domain in which Murphy has been exploring such "multi-task learning" is visual object recognition. The basic idea is that it may be easier to learn to recognize many things at once than to recognize objects in isolation. One reason for this is that visual "parts" can be "shared" across categories. This reduces the amount of training data required.

Another reason is that many objects co-occur, that is, objects together form part of scenes. It turns out to be easier to recognize scenes first, and then to recognize the objects within them. For example, it is easy to distinguish indoor images from outdoor images, based on the global statistics of the image (e.g., average brightness, presence of horizon lines, etc). Having recognized the scene as an outdoor one then primes the system to expect certain kinds of objects, such as cars and pedestrians. This "top-down" approach to computer vision is particularly important in real-time applications like robotics.

Machine Learning for Bioinformatics

Recently, Murphy has started to collaborate with ICICS colleague Raymond Ng on a problem in cancer genetics. Specifically, the goal is to find repeatable patterns in comparative genomic hybridization (CGH) data. "This is essentially a signal segmentation problem," Murphy says. "What makes it difficult is that the signal is so noisy.

Continued on page 8

Birch: ***Continued from page 3***

Imagine not being able to move the cursor of your computer when you want, or turn on the lights, or change TV channels. Instead the device operates by polling the user at regular intervals, which is disruptive to normal daily activities.

In order to develop asynchronous, or self-paced, BI devices Birch and his lab realized the need to define different periods of control. Intentional control (IC) is differentiated from the state of No Control (NC), when a person does not intend use and wants the system to remain quiet, such as when they are talking, thinking or simply observing. Birch realized that in many applications, people are more frequently in a NC state. By allowing the user to define when things happen, asynchronous control is less intrusive, less frustrating, less fatiguing, and much more rewarding for the user.

Currently, there are only three other groups around the world working on asynchronous BI technology. Birch and his lab plan to expand their work in non-invasive EEG systems for use in implantable devices, where miniature radio transmitters are screwed into the skull. Although more invasive, these devices are desirable from a cosmetic and practical standpoint, and scientists believe they will also have an improved signal-to-noise ratio. "Everything we have learned about user control challenges can be applied to implantable technology. So we are making contributions on two levels."

Gary Birch can be contacted at 604.473.9363 or garyb@neilsquare.ca

Wohlstadter: ***Continued from page 4***

"People follow these rules for different reasons," says Wohlstadter. "Often it is to ensure the software is easy to maintain." However, this additional coding can become complicated and cumbersome over time, especially when the software is not properly modularized. Imagine a car being made as one giant interweaving piece of machinery, Wohlstadter explains. When something malfunctioned, you couldn't just replace a fuel pump or starter; the entire vehicle would have to be replaced.

Several books have been written on developing design rules, but so far there has been a lack of support to encode these informal rules so they can be automatically checked or enforced. Wohlstadter and ICICS colleague Kris De Volder have been working with Microsoft to develop a language that is specific for design rules and that operates on a much higher level than traditional programming languages. "The benefit for programmers is that they can check as many rules as they want without being limited by implementation constraints."

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Murphy: ***Continued from page 7***

In addition, the variation in the signal due to cancer is masked by other sources of variation, which are specific to each person. The challenge is to tease apart these different signals." The approach Murphy is following is to use hierarchical Bayesian models, which are capable of leveraging prior biological knowledge.

Computational Statistics

Many of the models that people use in machine learning—whether for computer vision, bioinformatics or other applications—are quite complex. Computational tractability turns out to be a very important issue. In a third strand of research, Murphy is investigating efficient algorithms for approximate inference in complex probabilistic graphical models. He is also interested in developing software to make such complex algorithms more widely accessible to the user community.

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NSERC-Pratt & Whitney Canada Industrial Research Chair Wins Top Honours

Yosuf Altintas' "Virtual Machining System" was selected as the "Science-based Manufacturing Technology of the Year" for the International Machine Tool Show held in Chicago in September. The IMTS is the largest show of its kind in the world, with 125,000 attendees. A short film about the technology was shown during the exhibition.

CCPE Award for Elizabeth Croft

The Canadian Council of Professional Engineers has given **Elizabeth Croft** (Mech Eng) its Award for the Support of Women in Engineering. Hundreds of young female students have been inspired by Croft to enter the engineering profession. Her initiatives such as UBC's Engineering Tri-Mentoring Program have helped them flourish. Croft works in robotics and industrial engineering.

Gail Murphy a Two-Time Winner

Gail Murphy (CS) has won one of six NSERC Steacie Fellowships awarded for 2006. Murphy has also been given the 2006 Anita Borg Early Career Award by the Committee on the Status of Women in Computing Research. The award recognizes research contributions of women in computer science and/or engineering as well as their outreach to women.

CAGS/UMI Distinguished Dissertation Award

The Canadian Association for Graduate Studies has selected ECE professor **Konrad Walus** as one of two winners of this year's CAGS/UMI Distinguished Dissertation Award. Sponsored by University Microfilms International (UMI), the award recognizes Canadian doctoral dissertations that make unusually significant and original contributions to their academic fields.

UBC Programming Team at ACM World Finals

After winning the ACM Regional Collegiate Programming Contest in November 2005, the **Computer Science** programming team tied for 13th place out of 81 qualifying teams at the World Finals in San Antonio, Texas in April 2006. Congratulations to Matthew Chan, Dustin Tseng, Yury Kholondyrev and coach Bartholomew Furrow.

Faculty of Science Achievement Awards for Service

Kellogg Booth (CS) has won a Faculty of Science Achievement Award for Service, for his efforts in recruiting and developing faculty in Graphics and Human–Computer Interaction associated with the Imager lab. Kelly was also acknowledged for his work on departmental space and computing infrastructure issues over the last several years.

Moyra Ditchfield of the Computer Science technical staff has also won a Faculty of Science Achievement Award for Service. Moyra was selected for her work on the departmental aspects of the ICICS/CS Addition and Dempster Pavilion construction, and for years of managerial excellence and technical innovation.

Best Paper Award for ECE Professors

Lutz Lampe and **Robert Schober** of ECE, along with W.H. Gerstacker, have won a Best Paper Award from the European Association for Signal Image Processing for their paper, "On Suboptimum Receivers for DSCDMA with BPSK Modulation." The award was presented at the European Signal Processing Conference in Florence, Italy in September.

TLEF Funding for ECE Professors

The UBC Teaching and Learning Enhancement Fund has awarded ECE professors **Vincent Wong**, **Hussein Alnuweiri**, **Konstantin Beznosov**, and **Victor Leung** $27,900 to create a hands-on interactive learning lab for undergraduate and graduate students. The lab will allow students to perform a variety of experiments on a dedicated PC network.

BCNET Coolest Applications Contest Winners

Three Computer Science graduate students swept the BC.Net Coolest Applications Contest in April. **Son Vuong**'s students Xin Liu and Anthony Yu took first and second place, respectively, and Camilo Rostoker (supervisors **Alan Wagner** and **Holger Hoos**) took third. Cash prizes ranged from $1,500 to $3,500. BCNET provides advanced networking to the province's research and education community.

Collaborative Research and Development Grant for Wireless Research

Victor Leung and **Vincent Wong** of ECE have been awarded a $180,000 NSERC Collaborative Research and Development Grant sponsored by Bell Canada for their project, "Interworking between Cooperative Access Networks over IP Backbone". The project aims to support seamless mobility management between different types of wireless networks (e.g., cellular wireless, WLANs).

Interactive Workroom Improvements

Kellogg Booth and ICICS colleagues, along with UBC Fisheries Centre researcher Villy Christensen, have won a $113,000 NSERC Research Tools & Instruments award for their project, "Direct Multi-touch Interaction for a Very Large Wall Display." The team will use advanced input sensing technology developed by SMART Technology to augment the collaborative capabilities of the ICICS Interactive Workroom.

Edmond Cretu Wins Romanian Academy Award

Significant contributions to Romania's intellectual and cultural life are recognized annually by the Romanian Academy with once-in-a-lifetime awards. **Edmond Cretu** (ECE), along with his former research group from Delft University of Technology, have been given the "Tudor Tanasescu" award by the Academy's Information Science and Technology section for their microsystems research.

Computer Science Graduate Wins Faculty of Science Prize

Jihong Ren (CS), a student of **Mark Greenstreet**, has won the inaugural Faculty of Science Graduate Prize—PhD. The award recognizes the student whose record is the best among all doctoral graduates in the Faculty of Science. Jihong's thesis focuses on optimal equalizing filter design for high-speed, point-to-point, off-chip buses.

Passing Notes:

MSS Program Expands to Greece
Since January 2000, the Master of Software Systems program under the directorship of **Panos Nasiopoulos** (ECE) has been equipping science and engineering graduates for careers in the software industry. Now, thanks to the program's expansion to the DEI Institution in Thessaloniki, Greek students have the same opportunity. The first students started the 16-month program in January 2006.

Inaugural ICICS/Industry Dinner
The weather cooperated for a highly successful industry dinner held by ICICS on June 28 at Cecil Green House. Senior executives from local high-tech industries, along with their ICICS hosts and other key UBC personnel, enjoyed talks by **Angus Livingstone** and **Gary Albach** of the Industry Liaison Office, and **Rabab Ward** of ICICS. The cross-fertilization made possible by this dinner has already generated research collaboration.

CIHR Grant for Safer Anesthesia
The CIHR has awarded a $280,404 operating grant to PI Mark Ansermino of BC Children's Hospital and co-PIs Peter Choi (BCCH), **Guy Dumont** (ECE) and **Sidney Fels** (ECE) to develop a system that would automatically detect adverse events during anesthesia and make appropriate suggestions to clinicians.

$509,856 for Gene Expression Research
A team led by Charles Haynes of Michael Smith Laboratories has been awarded a $509,856 NSERC/CIHR CHRP grant to develop a new tool for analysing gene expression. **Lukas Chrostowski** of ECE is a co-PI, along with Robin Turner (Michael Smith Laboratories/ECE), Michael Blades (Chemistry), and Philip Hieter (Medicine).

Guidance System for Treating Prostate Cancer Receives U.S. and Canadian Funding
Tim Salcudean (ECE), James Morris (BC Cancer Agency) and Gabor Fichtinger and A. Song from Johns Hopkins University have been awarded an NIH grant of US$273,659 to develop an ultrasound-based system for localizing radioactive seeds used in treating prostate cancer. Salcudean, Morris and Ingrid Spadinger (BCCA) have also received a $307,962 NSERC/CIHR CHRP grant for their related study, "Image-based guidance system for prostate brachytherapy".

AMPEL/ICICS Student Workshop
The Advanced Materials and Process Engineering Laboratory (AMPEL) and ICICS have opened a new student prototyping workshop that is available to all ICICS faculty, staff and grads for light use. Heavier-use projects will be levied appropriate user fees to help offset maintenance and supervision costs.

ECE Researchers Study Parkinson's Disease
Jane Wang and **Rafeef Abugharbieh** of ECE, along with Farsal Beg of SFU, are co-PIs on a study led by Martin McKeown of the Brain Research Centre that assesses functional brain connectivity in neurodegenerative disorders such as Parkinson's disease. The study is funded by an NSERC/CIHR CHRP grant in the amount of $343,963.

Carl Ollivier-Gooch Wins Killam Teaching Prize
Carl Ollivier-Gooch of Mechanical Engineering was one of three winners of Killam Teaching Prizes at UBC this year. The prize is considered to be the University's highest teaching honour. Nominations are put forward by students, colleagues, and alumni in recognition of excellence in teaching, and are adjudicated within each Faculty.

ICICS Technical Committee Wins Spencer Award
In the spring edition of FOCUS, we told you about the NetApp Innovation Award won by ICICS. Now the ICICS Technical Committee, chaired by **Luca Filipozzi** (ECE), has won a 2006 Richard A. Spencer Award for their vision underlying the ICICS Unified Network. The award recognizes outstanding innovation and creativity in IT at UBC.

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•I•C•I•C•S• Institute for Computing, Information and Cognitive Systems www.icics.ubc.ca

UBC's Institute for Computing, Information and Cognitive Systems (ICICS) is an umbrella organization that promotes collaboration between researchers from the faculties of Applied Science, Arts, Commerce, Education, Forestry, Medicine, and Science. ICICS supports the collaborative computer-oriented research of more than 150 faculty members and over 800 graduate students in these faculties. ICICS researchers attract approximately $15 million in annual grants and contracts. Their work will have a positive impact on us all in the future.

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