

Alexander Ferworn, CD, PhD

Professor

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Education:

1998: Doctor of Philosophy, System Design Engineering, The University of Waterloo. Autonomy and autonomous agents/robots.

1992: Master of Science, Computing and Information Science, The University of Guelph. Artificial Neural Networks and their application to the automatic conversion of text into speech sounds. Additional work was conducted in the field of human factors in computing.

1988: Bachelor of Technology, Applied Computer Science, Ryerson Polytechnic Institute.

Academic Experience:

**September 1996- Present, Professor, Graduate Program Director and Associate Chair, Department of Computer Science
Ryerson University**

As an instructor at Ryerson I am responsible for presenting 2 or 3 undergraduate courses in computer science per term. These courses include CS1 and CS2 in C and Java, AI, Autonomous Mobile Systems and various CS service courses. I also teach several graduate courses including Research Methods, Presence and Methods of Instruction.

I am the graduate program director for Ryerson's Doctoral and Master of Science programs in Computer Science (both of which I designed and worked to have approved). I have formed a research group and I am the director of research for the Network-Centric Applied Research Team (N-CART) involved in applied research in the field of digital network services, intelligent agents, Search and Rescue, Urban Search And Rescue (USAR) robotics and Chemical Biological Radiological Nuclear explosive (CBRNe) robotics.

As of January 2012 I have taken on the role of the Faculty of Engineering and Architectural Science (FEAS) Dean's Liaison to the Chang School of Continuing Education (CE). My responsibilities include identifying, proposing and fostering the creation of new certificate programs related to FEAS interests and competencies within the Chang School. I have created, and am the program director for, the Certificates in Disaster and Emergency Management (March 2011) and the Certificate in Computer Security and Digital Forensics (January 2012).

I serve on (or have served on) many committees at all levels within Ryerson including the Faculty of Science Implementation committee, the Chief Librarian Search committee, various Provost working groups and I am a Senator at large. I have been an avid supporter of Science Rendezvous (from inception at Ryerson)--organizing many students volunteers and demonstrating.

**September 1992 - June 1996, Instructor,
Faculty of Continuing Education,
Ryerson Polytechnic University.**

I presented one or two evening courses for the school of Computer Science each semester. These included, Data Structures, Structured Programming in C and a course in Soft Computing and Artificial Intelligence.

**February 1996 - August 1996, Technology Team Leader,
The Eaton School of Retailing,
Ryerson Continuing Education and Bell Canada**

The Eaton School of Retailing was a corporate entity within what was the T. Eaton Company Ltd. It was established to manage the delivery of corporate education in Eaton's. In partnership with Ryerson, the school sought to develop and deliver university level programming to its students. As a team leader I oversaw and coordinated the selection of technology for Ryerson's distance education offering for the school. The focus was to use enhanced multimedia tools, including video conferencing, to present course material in a cost-effective manner. Some of this technology was eventually reused in Ryerson Continuing Education.

**May-August 1995, Lecturer,
Department of Computing and Information Science,
The University of Guelph.**

In conjunction with Dr. Deborah A. Stacey we presented a graduate course involving intelligent systems and mobile robotics. The goal of the course was to have students actually build robots, which could interact with a specified world in intelligent ways. This goal was achieved and culminated in a final competition, which was attended by various representatives from Industry and Education.

Research Interests

- Robotics (ground and air)
- Autonomous Systems
- Teleoperation, telepresence, computer-machine mediation systems

- Mechatronics,
- Human Factors
- Response Robotics
- Non-intrusive technological augmentation of animals
- Computational Public Safety (Specifically, USAR)

Research Experience

September 1996 - Present, Director of Research

The Network-Centric Applied Research Team (N-CART)

School of Computer Science

Ryerson University

As the research director I coordinate the efforts of 3 faculty members and provide direction to 2 doctoral students and five masters students who perform applied research in the area of extending intelligent network services to non-traditional computing devices (including biological ones). Current and past sponsors include, NSERC, Public Safety Canada, The OPP, Bell Canada, Bell Global Solutions, Bell Sygma, Apple Canada and Moby Dark. Our web site is ncart.scs.ryerson.ca.

January 1991 - 2000, Primary Investigator - Autonomous Systems,

The Natural Selection Research Group,

Department of Computing and Information Science,

University of Guelph

The group was established By Dr. Deborah A. Stacey to further research in the areas of machine intelligence in various forms including genetic algorithms, artificial neural network, fuzzy systems and mobile robotics. The group has worked extensively with such organizations as the Department of National Defence, Ontario Hydro, and many others. My research interests have included text-to-speech processing using neural networks, sonar target identification, and speech recognition. I was the group's primary investigator in the area of robust intelligent autonomous systems. I maintain contact with the group as a Adjunct Professor within the Department of Computing and Information Science at the University of Guelph.

September 1993 - October 1997,

Pattern Analysis and Machine Intelligence Group (PAMI),

Department of Systems Design Engineering,

University of Waterloo

The PAMI group was established in 1980 with the objective of providing resources to researchers in the areas of pattern analysis and machine intelligence and to promote technology transfer between the university and industry. My own work as a graduate student centered on the application of simple, robust neural networks to the field of autonomous agents-especially fast learning.

September 1990 - May 1992

Associate, Human Computer Interaction Design Lab,

Department of Computing and Information Science,

University of Guelph

Under the direction of Dr. Tom Carey, the goal of the HCI design lab was to further the understanding of how humans interact with computing machinery. Interests in the lab were far ranging, encompassing fields such as computer supported cooperative work, usability testing, and HCI design tools. I contributed to various user and product studies including the IBM Book Manager and Bell Northern Research VISIT usability studies. Through this affiliation I was an active member of SIGCHI of the ACM through the TORCHI chapter, and was a student volunteer at both the 1991 and 1992 ACM CHI conferences.

Professional Experience:

Full time:

**Jan 1996 - August 1996, Associate Director,
Intelligent Network Solutions,
Bell Global Solutions.**

Reporting to the Vice President of Intelligent Network Solutions, I was responsible for scouting technology, resources and new markets for Bell Global Solutions' and Bell Canada's Network-centric solutions. I also provided system integration and development services on a contract basis to other Bell organizations. My primary focus was the development of Bell's Call Centre and IVR strategies through the use of an intelligent embedded-computing national network based on IBM RISC6000 processors. I was one of several team leader who worked with a diverse set of technical, management and client organizations to craft complex services into purchasable packages that addressed client needs.

**Mar 1995 - Jan 1996, Technology Consultant,
Technology Department,
Bell Sygma Inc.**

Reporting to the Vice President for technology, my primary responsibilities were the investigation, prototyping and dissemination of leading-edge technology to the rest of Bell Sygma and Bell Canada. I was responsible for Bell Canada winning several contracts deploying its networks to various government organizations. I was also responsible for forging alliances with academic institutions. During my tenure, Bell Canada formed significant relationships with The Universities of Waterloo and Guelph. In this position, I became the de facto Web Master for Bell Canada's intranet reaching approximately 5,000 people. I was also one of the system architects who developed the Bell Information Technology Architecture (BITA)--Bell's next-generation computing, service and productivity environment.

**April 1992 - Mar 1995, System Analyst,
PERMITS project,
Bell Sygma Telecom Solutions.**

The Project Estimate Resource Management Information Tracking System (PERMITS) was a large Ingres relational database application spanning two provinces and supporting over 2000 users across Bell Canada. I was responsible for the maintenance and validation of all system reference tables, supplying program specifications, code enhancements and bug fixes. I was extensively involved in an effort to reverse engineer the project in order

to better document the application's function as well as to look for opportunities to improve its performance. The position required an extensive knowledge of SQL, embedded C, relational technology as well as a working knowledge of software engineering practices.

September 1990 - April 1992, System Manager - Budgets and Results, Expense District, Residential Sales and Service, Bell Canada.

I was responsible for the day to day operation of a VAX 6000-310 minicomputer running an Ingres application tracking budget and result information for Bell Ontario. One of my primary responsibilities was the rollout of the project to our client communities. The task required a detailed understanding of Bell's internal communication backbone, including its technological foundation, as well as an appreciation for each client's particular needs. The position required a sound knowledge of system management practices, VAX/VMS architecture, and data communications principles.

April 1990 - September 1990, Office Systems Associate, Systems Technology, Operations Development, Bell Canada.

This position required me to perform the initial evaluations of graphical user interface standards within Bell Canada. This required me to understand the technology available and the requirements of the Bell user community. Secondary responsibilities included chairing requirements and program walk-through meetings to bring various internally developed VM/CMS applications into production. I developed a good understanding of usability testing, REXX programming, and structured design and development methodologies.

May 1988 - April 1990, Information Services Support Centre Associate, Systems Development, Corporate Systems Organization, Bell Canada.

Initially I was responsible for the site management of a development laboratory primarily equipped with VAX, PDP, Sun and Tandem computers. The position eventually evolved into one requiring me to develop applications for internal clients--primarily in Fortran and C.

My general responsibilities included providing day to day management of the lab, performing hardware and software evaluations and, provisioning an effective disaster recovery plan. This assignment was interrupted by an emergency work assignment during a strike within Bell Canada. I became responsible for the installation and repair of telecommunications services to Bell Canada's residential and single line business customers.

June 1980 - November 1994, Company Commander, Combat Service and Support Company, The Royal Regiment of Canada, Canadian Forces Primary Reserve.

For fourteen years I was a member of this infantry battalion. Having joined as a private soldier and progressed through the ranks, I held virtually every position within an infantry Company, retiring with the rank of Captain. During my career I took many courses on leadership and instructional technique and have been given many opportunities to apply this knowledge in very practical settings in some interesting situations and parts of the world. In my role as Company Commander I was responsible for the administration and leadership of over 120 personnel under operational conditions. I received the Canadian Forces Decoration (CD) in 1992.

Consulting Positions

October 2004 – Present

Scientific Research and Experimental Development (SR&ED)

I act as a technical advisor to clients who wish to participate in the federal government's SR&ED program providing advice on how applied research conducted within a company can be formalized and documented to qualify for government rebates (SR&ED) and assistance (IRAP).

September 2002 – January 2003

HumCorp Networks Inc.

I, and graduate students within the NCART lab, worked with the Chief Technology Officer of this company to introduce a new wireless product to the European market related to multipoint voice communications in the 900 Mhz band.

November 2001 - May 2002

Sick Children Hospital

I and several member of my lab worked with Dr. Bill Williams, the Chief Cardiologist at Sick Children Hospital and the Congenital Heart Surgeon's Society to develop their first on-line survey for collecting information related to surgical conduit implants in infants. The goal of the study was to determine why there is a high rate of failure of implants within two years of the initial procedure in very young children. In the past such a study would have been conducted by FAX or mail however, this study allowed participating institutions to directly and securely enter patient and surgical data into a central data repository using any web browser and a phone. The technology was new to the hospital and this was a first-of-a-kind demonstration project that is being used as the basis for similar projects.

May 2000 - January 2001

Moby Dark Inc.

I, and my lab, were engaged to conduct an investigation into the deployment of new wireless devices into the consumer market based around Moby Dark's wireless router technology and the N-CART labs Heating Ventilation and Air Conditioning (HVAC) monitoring prototype.

February 1999 - September 2000

Personification Inc.

I was initially engaged as the project manager for a large development effort associated with reasoning and personalization engines being developed for Bell Canada. I eventually became part of the company's marketing and sales groups, acting as the system architect for various Internet-based audio products. In addition, I supported marketing and sales efforts through the creation of compelling demonstrations, presentations and other collaterals.

September - October 1998**Bell Canada**

As part of their due diligence effort I was engaged by Bell to help architect the relationship that Bell would have with the Universities of Toronto and Waterloo in its effort to create the "Bell Canada University Labs". My task was to bridge the gap between the competitive world of telephony and academia. The project involved the philanthropic transfer of \$21M to these universities.

October 1997 - July 1998**Berkshire Investment Group**

I was involved in the selection of a new brokerage back office system for the company as well as helping to devise a consistent and effective Internet strategy. In addition, I developed several utility programs to work around problems associated with their back office system.

February - October 1997**Systems Group****AIC Group of Funds**

I was contracted to implement an interactive voice response (IVR) system coupled to the corporate transaction engine (AS400). The intent was to free human resources within the existing call centre from answering simple questions related to AIC's fund prices. The solution was highly successful and resulted in a significant saving in both time and money and improved functionality. In addition I was involved in training and implementing procedures within the group and advising corporate principles concerning the strategic use of information technology.

September 1997 - March 1998**Personal Digital Assistant Research Group****Apple Canada**

My research team was contracted to examine the interface to Apple's Newton Personal Digital Assistant. We focused on issues related to network connectivity and usability. We presented our work to the president of Apple Canada at the end of the contract.

Publications**Book Chapters**

- A. Ferworn, "Canine Augmentation Technology for Urban Search and Rescue" in Canine Ergonomics – The Science of Working Dogs, William S. Helton (Ed.), CRC Press Taylor and Francis Group, 2009, Boca Raton, Florida, USA, ISBN: 978-1-4200-7991-3.

- A. Ferworn, K. Plataniotis, “Teleoperation Over the World Wide Web” in Robotics and Applications, M.H. Hamza (Ed.), Acta Press Series on Robotics and Manufacturing, 1999, Calgary, Alberta, Canada, ISBN: 0-88986-265-6 (304).

Journal Papers

- **C. Ribeiro**, A. Ferworn, M. Denko, and **J. Tran**, “Wireless Mesh Network Performance for Urban Search and Rescue Missions”, International Journal of Computer Networks & Communications (IJCNC), 2010, Vol 2, Issue 2, pp. 38-57
- L. Dell’Agnese and A. Ferworn, “Work Apparel for Urban Search and Rescue Dogs”, Descant, Volume 40, No. 1, pp. 73-81, 2009
- A. Ferworn, D. Ostrom, K. Barnum, M. Dallaire, D. Harkness, and M. Dolderman,, "Canine Remote Deployment System for Urban Search and Rescue", Journal of Homeland Security and Emergency Management: Vol. 5 : Iss. 1, Article 9. 2008
- A. Ferworn, **A. Arora**, and M. Jaseemuddin, IP Mobility Issues for a Mobile Tele-Robotic System - NEPWAK, International Journal of Automation and Computing, Special Issue of Online Robots and E-automation, 2004.

Refereed Conferences

- **J. Tran**, **A. Ufkes**, M. Fiala, A. Ferworn, "Low-Cost 3D Scene Reconstruction for Response Robots in Real-time," in IEEE International Workshop on Safety, Security & Rescue Robotics (SSRR-2011), Nov 1 - 6 2011, Kyoto, Japan, 2011
- Ferworn, **J. Tran**, **A. Ufkes**, **A. D'Souza**, "Initial Experiments on 3D Modeling of Complex Disaster Environment using Unmanned Arial Vehicle," in IEEE International Workshop on Safety, Security & Rescue Robotics (SSRR-2011), Nov 1 - 6 2011, Kyoto, Japan, 2011
- **S. Sharieh**, K. Sartipi, A. Ferworn, "Light-weight Protocol Simulation for Binary Data Exchange over Heterogeneous Networks", Communications and Networking Simulation Symposium (CNS 2010), April 12-15, 2010, Orlando, Florida, USA.
- **J. Tran**, A. Ferworn, “Bark Indication Detection and Release Algorithm for the Automatic Delivery of Packages by Dogs”, 6th International Wireless Communications and Mobile Computing Conference (IWCMC 2010), June 28 – July 2 2010, Caen, France
- **J. Tran**, **M. Gerdzhev**, A. Ferworn, “Continuing Progress in Augmenting Urban Search and Rescue Dogs”, 6th International Wireless Communications and Mobile Computing Conference (IWCMC 2010), June 28 – July 2 2010, Caen, France
- **M. Gerdzhev**, **J. Tran**, A. Ferworn, “A Scrubbing Technique for the Automatic Detection of Victims in Urban Search and Rescue Video”, 6th International Wireless Communications and Mobile Computing Conference (IWCMC 2010), June 28 – July 2 2010, Caen, France
- **S. Sharieh**, K. Sartipi, A. Ferworn, “Light-weight Protocol Simulation for Binary Data Exchange over Heterogeneous Networks”, 2010 Spring Simulation Multiconference (SpringSim'10), April 11-15, 2010, Orlando, Florida, USA
- **H. Rahnama**, A. Sadeghian, A. Ferworn and X. Aubry “A Context-Aware Development Framework for Building Self-Adaptive Mobile Software for Public Transport Systems,” in Proc. of the 2009 16th World Congress on Intelligent Transport Systems, Stockholm, Sweden, 25-29 Sept. 2009.

- **C. Ribeiro**, A. Ferworn, **J. Tran** (2009) An Assessment of a Wireless Mesh Network Performance for Urban Search and Rescue Task. IEEE TIC-STH. 369-374.
- **H. Pham**, Q. Mahmoud, and A. Ferworn, "Intelligent agent control using simple logic-based hierarchical planning", IEEE SMC Fourth International Conference on System of Systems Engineering 2009, May 31-June 3, 2009, Albuquerque, New Mexico, USA.
- I. Woungang, G. Ma, M.K. Denko, A. Sadeghian, S. Misra, A. Ferworn, "Survivability in Existing ATM-Based Mesh Networks", The IEEE 23rd International Conference on Advanced Information Networking and Applications (AINA'09), May 26-29, 2009, University of Bradford, Bradford, UK
- **C. Ribeiro**, A. Ferworn, M. Denko, **J. Tran**, "Canine Pose Estimation – A Computing for Public Safety Solution", IEEE CRV 2008, May 25-27, 2009, Kelowna, BC, Canada.
- **S. Bokhari Syed**, A. Ferworn and A. Abhari, "Implementation of Architectural Model for Grid Resources Discovery", In CNS Session, Proceedings of the 2009 Spring Simulation Multi Conference, March 22 - 27, 2009, San Diego, USA.
- **S. Bokhari Syed**, A. Ferworn and A. Abhari, "Architectural Model for Grid Resources Discovery", In Poster Track Session Proceedings of the 2008 Spring Simulation Multi Conference, April 14 - 17, 2008, Ottawa, Canada.
- **C. Ribeiro**, A. Ferworn, M. Denko, **J. Tran**, C. Mawson, "Wireless Estimation of Canine Pose for Search and Rescue", IEEE Systems of Systems Engineering (SoSE'08), June 2-5, 2008, Monterey, CA, USA.
- **J. Tran**, A. Ferworn, **C. Ribeiro**, M. Denko, "Enhancing Canine Search", IEEE Systems of Systems Engineering (SoSE'08), June 2-5, 2008, Monterey, CA, USA.
- **S. Sharieh**, A. Ferworn, O. Pucci, S. Stepanov, V. Toronov, and A. Venetsanopoulos, "Determining cerebral hemodynamic responses to naturally administered cigarette smoke using a fully mobile near-infrared sensor", CAP Congress, Quebec, June 8-11, 2008
- **S. Sharieh**, A. Ferworn, V. Toronov, (2008), "A GSM Mobile System to Monitor Brain Function Using a Near-Infrared Light Sensor", In Proceedings of the 21st Canadian Conference on Electrical and Computer Engineering, May 5-7, 2008, Niagara Falls, Ontario, Canada.
- **S. Sharieh**, A. Ferworn, V. Toronov, A. Abhari, "An Ad-hoc Network Based Framework for Monitoring Brain Function", the 11th Communications and Networking Simulation Symposium, Ottawa, Canada, April 14-17 2008, ACM, New York, NY, USA.
- **E. Coleshill**, A. Ferworn, D. Stacey, "Image Enhancement using Frame Extraction Through Time", CISSE 2007, Dec 3-12, 2007, Online.
- I. Woungang, S. Misra, A. Sadeghian and A. Ferworn. "A Minimum Distance Bound on 1-Generator Quasi-Cyclic Codes". Proc. of the 10th Canadian Workshop on Information Theory (CWIT 2007), Edmonton, Alberta, Canada, June 6-8, pp. 156-159, IEEE Catalog # 07EX1602C, ISBN: 1-4244-0769-9, 2007.
- **H. Pham**, Q. Mahmoud, A. Ferworn, A. Sadegian, "Applying Model-Driven Techniques to Pervasive System Engineering", Proc. Of the 29th Intl. Conf. on Software Eng. (ICSE07), May 20-26, 2007, Minneapolis, USA.

- **H. Pham**, A. Ferworn, Q. Mamoud, A. Sadeghian, “Applying Model-Driven Development Techniques to the Development of Search and Rescue Systems”, IEEE SoSE 2007, April 16-18, 2007, San Antonio, TX, USA.
- A. Ferworn, A. Sadeghian, K. Barnum, D. Ostrom, H. Rahnama, I. Woungang, “Canine as Robot in Directed Search”, IEEE SoSE 2007, April 16-18, 2007, San Antonio, TX, USA.
- A. Ferworn, A. Sadeghian, K. Barnum, D. Ostrom, **H. Rahnama**, I. Woungang, “Rubble Search with Canine Augmentation Technology”, IEEE SoSE 2007, April 16-18, 2007, San Antonio, TX, USA.
- A. Ferworn, **N. Tran**, **J. Tran**, G. Zarnett, F. Sharifi, "WiFi repeater deployment for improved communication in confined-space urban disaster search", IEEE SoSE 2007, April 16-18, 2007, San Antonio, TX, USA.
- A. Ferworn, **N. Tran**, **J. Tran**, G. Zarnett, F. Sharifi, **J.E. Coleshill**, A. Ferworn, D. Stacey, "Obstruction Removal using Feature Extraction Through Time for Video Conferencing Processing" , CISSE 2006, Dec 4-14, 2006, Online.
- **J.E. Coleshill**, A. Ferworn, D. Stacey, "Traffic Safety using Frame Extraction Through Time", SoSE 2007, April 16-18, 2007, San Antonio, TX, USA.
- **J.E. Coleshill**, A. Ferworn, D. Stacey, "Feature Extraction Through Time", 57th International Astronautical Congress, IAC-06-B4.4.03, Valencia Spain, Oct 2-6, 2006.
- A. Ferworn, G. Hough, R. Manca, “Expedients for Marsupial Operations of USAR Robots”, IEEE International Workshop on Safety, Security and Rescue Robotics (SSRR06), Gaithersburg, MD, USA, August 22-24, 2006.
- A. Ferworn, A. Sadeghian, **H. Rahnama**, **H. Pham**, C. Erikson, K. Barnum, D. Ostrom, L. Dell’Agnese, “Urban Search and Rescue with Canine Augmentation Technology”, 2006 IEEE International Conference of Systems of Systems (SoSE’06), Los Angeles, USA, Apr 24-26, 2006.
- **A. Arora**, A. Ferworn, “Pocket PC Beacons: WiFi-Based Human Tracking and Following”, ACM Symposium on Applied Computing (SAC2005) Special Track on Handheld Computing, Santa Fe, New Mexico, USA, March 13-17, 2005.
- A. Ferworn, **A. Arora**, and M. Jaseemuddin, “IP Mobility Issues for a Mobile Tele-Robotic System – NEPWAK”, International Journal of Automation and Computing, Special Issue of Online Robots and E-automation, ISSN1476-8186, pp. 10-16, October 2004.
- **J.E. Coleshill**, A. Ferworn. Spherical Panoramic Video For Micro-Gravity Applications”, 55th International Astronautical Congress, Vancouver, Canada, Oct 4-8, 2004.
- A. Ferworn, **W. Lu**, **A. Arora**, **W. Shiu** and D. Ostrom, “Telebotic Control of a Powered-Wheelchair across the WWW – NEPWAK”, The 2nd International Conference on Mechatronics and Information Technology, Cheongpung Resort Hotel, Jecheon, Korea, December 4-6, 2003.
- **J.E. Coleshill**, A. Ferworn, “Spherical Panoramic Video – The Space Ball”, The 2003 International Conference on Computational Science and its Applications, ICCSA’03, Montreal, Canada, May 18-21, 2003. A. Ferworn, W.Lu, “Optimization For Video and Telebotic Control on Palm OS PDAs”, Proc. Of the International Conference on Internet Computing (IC’02), Las Vegas, USA, June 24-27, 2002.

- A. Ferworn, **W. Shiu**, **W. Lu**, “Constrained Image Understanding Using Lossy Compressed Images”, Proc. Of the IASTED International Conference for Robotics and Applications (RA’01), Clearwater, Florida USA, November 19-22, 2001.
- A. Ferworn, **J.E. Coleshill**, “Challenges for Mobile Internet Appliances”, Proc. Of the IASTED International Conference for Robotics and Applications (RA’01), Clearwater, Florida USA, November 19-22, 2001.
- A. Ferworn, **B.D. Torres**, **S. Patel**, S. Kanellis, “The Internet-Enabled Furnace”, Proc. Of the IASTED International Conference for Intelligent Systems and Control (ISC’01), Clearwater, Florida USA, November 19-22, 2001.
- A. Ferworn, **W. Shiu**, K. Plataniotis, “Constrained Image Understanding for an Internet Robot Supporting Telepresence”, Proc. Of the 2001 IEEE Canadian Conference on Electrical and Computer Engineering, Toronto, Ontario, Canada, May 13-16 2001.
- A. Ferworn, R.C. Bodner, and M.H. Chignell, “Auditory WWW Search Tools”, Proc. Of The Sixth International Conference on Auditory Display, Georgia Institute of Technology, Atlanta, Georgia USA, April 2-5, 2000.
- A. Ferworn, K. Plataniotis, “Effective Teleoperation Over the World Wide Web”, Proc. Of the IASTED International Conference for Robotics and Applications (RA’99), Santa Barbara, USA, October 28-30, 1999.
- A. Ferworn, K. Plataniotis, “Solenodon: Unstable Hexapod Walking”, Proc. Of the 5th International Conf. on Information Systems Analysis and Synthesis, Orlando, USA, July 31 – August 4, 1999.
- A. Ferworn, **R. Roque**, and **I. Vecchia**, “MAX: Teleoperated Dog on the World Wide Web”, Proc. Of the 2nd International Workshop on Presence, The University of Essex, Colchester, U.K., 6-7 April 1999.
- A. Ferworn, **R. Roque**, and **I. Vecchia**, “MAX: Wireless Teleoperation via the World Wide Web”, Proc. Of the 1999 IEEE Canadian Conference on Electrical and Computer Engineering, Edmonton, Alberta, Canada, May 9-12 1999. (In Print)
- A. Ferworn, and D.A. Stacey, “The Reflexive Instructor with Deliberate Apprentice Architecture”, Proc. Of the 1998 World Automation Congress, Anchorage, Alaska, USA, May 10-14 1998.
- A. Ferworn, and D.A. Stacey, “Inchworm Mobility—Stable, Reliable and Inexpensive”, Proceedings of the 3rd IASTED International Conference for Robotics and Manufacturing, June 14-16 1995, Cancun, Mexico.

Other Published Works:

- **W. Lu**, A. Ferworn. A Synchronization Mechanism for Real-Time Multimedia Communications Including Teleoperation, ICUE’04, Ryerson University
- **H.C. Lac**, A. Ferworn, SNP Analysis for Detecting Complex Disease Associated Sites, ICUE’04, Ryerson University
- **P. Mistry**, A. Ferworn, Optimization of Autonomous Robotic Vehicular Platform for Exploration of Celestial Bodies, ICUE’04, Ryerson University
- **A. Arora**, A. Ferworn, M. Jaseemuddin, Handover Issues for an Internet-Enabled Mobile Telebot System, ICUE’04, Ryerson University

- A. Ferworn, **A. Arora**, D. Ostrom and **W. Shiu**, “The Network-Enabled Powered Wheelchair Adaptor Kit – First Prototype”, Proc. Of the International Conference for Upcoming Engineers (I-CUE’03), Toronto, Canada, May 2, 2003.
- A. Ferworn, **W. Lu**, **J.E. Coleshill**, **W. Shiu**, “WAX: Next Generation Robot on the Web”, International Conference for Upcoming Engineers (I-CUE’02), Ryerson University, Toronto, Canada, May 2-3 2002.
- August 1998, Doctoral Thesis, “The Reflexive Instructor with Deliberate Apprentice Architecture”, Doctoral Thesis, Department of System Design Engineering, The University of Waterloo.
- December 1994, “The EMMA series of robots”, University of Guelph CIS Technical Report.
- November 1994, “The GARBOT series of robots”, University of Guelph CIS Technical Report.
- May 1994, “Neural Networks”, Proceedings of the TRIO/ITRC Researchers Retreat, May 10-12 1994, Queen’s University, Kingston, Ontario.
- May 1993, “Corpus Balancing and Generalization in a Neural Network Trained to Convert Text into Speech Sounds”, University of Guelph Technical Report, co-authored by D.A. Stacey.
- April 1992, Masters Thesis, “CHEAPtalk: An Improved Connectionist Text-to-Speech architecture”, Department of Computing and Information Science, The University of Guelph.

Patents

Inventors: A. Ferworn, K. Barnum and D. Ostrom inventors, Assignee: Ryerson University, “Remote Parcel Deployment System”, U.S. Patent # 7,878,154 B2, Feb. 1, 2011. (European patent in process.)

Graduate Student Supervision

Name	University	Department	Program	Start	End
Shiu, Wing	Guelph	Comp. and Info. Sci.	MSc	2001	2003
Coleshill, Elliott	Guelph	Comp.and Info. Sci.	MSc	2001	2003
Klotz, Greg	Guelph	Comp.and Info. Sci.	MSc	2002	2004
Pham, Justin	Guelph	Comp.and Info. Sci.	MSc	2003	2005
Lu, Wei	Ryerson	E&CE	MASc	2001	2003
Nguyen, Le	Guelph	Comp.and Info. Sci.	MSc	2003	2009
Lac, Hao	Guelph	Comp.and Info. Sci.	MSc	2002	2004
Arora, Ankit	Ryerson	E&CE	MASc	2003	2005
Tran, Jimmy	Ryerson	Comp. Sci.	MSc	2007	2009
Sommers, Vijay	Ryerson	Comp. Sci.	M.Sc	2007	2010
Ribeiro, Cristina	Guelph	Comp.and Info. Sci.	MSc	2006	2008
Coleshill, Elliott	Guelph	Comp.and Info. Sci.	PhD	2004	1010
Rahnama, Hossein	Ryerson	E&CE	PhD	2006	2010
Pham, Huy	Guelph	Comp.and Info. Sci.	PhD	2006	TBA
Somers, Vijay	Ryerson	E&CE	MEng	2007	2009
Bokhari, Saadat	Ryerson	Comp. Sci	MSc	2007	2010
Sharieh, Salah	Ryerson	Comp. Sci.	MSc.	2007	2008
Gerdzhev, Martin	Ryerson	E&CE	MASc	2008	2010
Tran, Jimmy	Ryerson	E&CE	PhD	2009	TBA
D’Souza, Andrew	Ryerson	Comp. Sci.	MSc	2009	2012

Shah, Waqas	Ryerson	Comp. Sci	MSc	2010	TBA
Ufkes, Alex	Ryerson	Comp. Sci.	MSc	2010	TBA
Khan, Bilal	Ryerson	Comp. Sci.	MSc	2011	TBA

International Missions

In March 2000, the MAX project of the N-CART team will be one of only ten projects across Canada to visit Tokyo, Japan as part of a Research and Development “Team Canada” mission sponsored by the Department of Foreign Affairs and International Trade.

Research Grants

Granting Agency	Start	Duration	Amount	Topic
Ryerson Starter Grant	1996	1 yr	\$5000	Personal Digital Assistants
Bell Sygma Inc.	1996	1 yr	\$1000	Personal Digital Assistants
Apple Canada	1996	1 yr	\$4500	Apple Newton PDA Study
Bell Sygma Inc.	1996	-	\$23000 (inkind)	Equipment Grant
Bell Canada	1996	2 yr	\$1000 (inkind)	Telephone Line
Active Surplus Annex	1997	1 yr	\$500 (inkind)	Sumo Robot Design in collaboration with Ontario College of Art and Design artist Norman White
NSERC (Discovery)	1998	2 yr	\$18000	Autonomous Systems
Bell Global Solutions	1998	2 Mths	\$6000	Competition Study – Fax services
Department of Foreign Affairs and International Trade	1999	4 days	\$10000	Sponsored “Team Canada” participant on research mission to Japan to demonstrate the Internet robot project: MAX ¹
NSERC (Discovery)	2000	4 yr	\$48000	Distributed Network Services for Remote and Teleoperated Systems
Moby Dark Inc.	2000	4 mths	\$2000	Collaborative Research Grant – Network-centricity
HumCorp Networks Inc.	2002	1 yr	\$2000 (inkind)	Network Routing Research
Microsoft Canada	2003	2 yr	\$25000 (USD)	Network-Enabled Powered Wheel-Chair Adaptor Kit Prototype
Invacare	2003	2 yr	\$15000 (inkind)	Network-Enabled Powered Wheel-Chair Adaptor Kit Prototype (3 Powered Wheelchairs donated)
Dog-Goes	2005	Ongoing	\$2000 (inkind)	Canine USAR

¹ A. Ferworn, R. Roque, and I. Vecchia, “MAX: Teleoperated Dog on the World Wide Web”, Proc. Of the 2nd International Workshop on Presence, The University of Essex, Colchester, U.K., 6-7 April 1999.

Ontario Provincial Police	2005	Ongoing	\$20000/yr (inkind)	Canine Augmentation Technology/ Improved Urban Search and Rescue Robotics/ improve CBRNe response robots
NSERC (EQPEQ program)	2007	1	\$44338	Vision-based micro-manipulation system for autonomous inspection and assembly of micro-parts
OPIC	2007	1	\$10000	CAT Demonstration Project at HUSAR exercise with OPP/PERT
OPIC	2008	3	\$25000	Canine Remote Deployment System Market Readiness
Ontario Centres of Excellence (Communication and Information Technology)	2008	6 mths	\$13703	Algorithm for the Automatic Placement of Nodes to extend emergency wireless networks.
Ontario Centres of Excellence (Photonics)	2008	6 mths	\$15000	Untethered near-infrared brain spectroscopy to monitor canine brain function.
NSERC (Discovery)	2010	5	\$31000	Human Interface for Canine Augmentation Technology Data
NSERC (Engage)	2010	6 Mths	\$25000	Dual Function Pressure Pipe Inspection Sensor Head—With Pressure Pipe Inspection Company
NSERC (Engage)	2010	6 Mths	\$25000	An Algorithm for Determining Acceptable Personal Space—With InteraXon Inc.

Personal Achievements:

- 2012: Research recognized by IEEE Spectrum, viewed by over 300000 Scientists and Engineers².
- 2011: National Institute of Standards and Technology award for contributions to the Response Robot Evaluation Exercise process. College Station, TX, USA.
- 2009: Nominated as “best lecturer” for TVO’s program “Big Ideas” competition.
- 2009: Named “Information Technology Hero” by the Information Technology Association of Canada (ITAC) for work research work in Urban Search and Rescue.
- 2007: Winner of the Ontario Government Showcase of Excellence awards (Gold and Diamond awards) for project achievement for the research project “Canine Augmentation Technology”.
- 2001-05: Recognized as one of the “Popular Profs” at Ryerson University by Macleans Magazine Guide to Canadian Universities.
- 1995: Received University of Waterloo Graduate Fellowship
- 1994: Recipient of the Maple Leaf Chapter of the Association of Old Crows
- 1994: Recipient of the University of Waterloo graduate scholarship.

² <http://spectrum.ieee.org/automaton/robotics/industrial-robots/search-and-rescue-dog-deploys-robot-snake-via-bark-control>

- 1992: Awarded the Canadian Forces Decoration for twelve years of service in the Canadian Force.
- 1992: University of Guelph Graduate Fellowship for academic achievement.
- 1988: Royal Regiment of Canada Association scholarships while attending Ryerson.

Memberships and Professional Affiliations

- Member of The Association for Computing Machinery (ACM)
- Member of the Institute of Electrical and Electronic Engineers (IEEE).
- Reviewer for the Ontario Graduate Scholarship program, have reviewed and refereed grants for various granting agencies including NSERC, OPIC and the OCE.
- Refereed many conferences and journals--generally related to wired and wireless networking and robotics.
- Member of the advisory council in the Department of Computer Science at the University of Ontario Institute of Technology.
- Adjunct professor in the Department of Computing and Information Science at the University of Guelph.
- Member of the advisory committee of the U.S. National Institute of Standards and Technology (NIST) reporting to the Department of Homeland Security (DHS) for the standardization of performance metrics for Search and Rescue (response) Robots (Through the ASTM standards organization on the Homeland Security Technology Committee E.54).
- Member of the graduate programs of the School of Fashion, the Department of Physics and the Department of Electrical and Computer Engineering at Ryerson.
- Member of Ryerson's Yeates School of Graduate Studies Council.
- "At large" member of Ryerson's Senate.
- Former Auxiliary member of the Ontario Provincial Police (OPP), attached to the Urban Search and Rescue, Chemical, biological, radiological, nuclear explosive Response Team (UCRT) in Bolton, ON. (2008-10)
- Subject of a memorandum of understanding (MOU) between Ryerson University and the OPP in which my lab and UCRT will conduct joint research efforts into public safety systems (from 2006).

References:

Available on request.