



FORM 100
Personal Data Form
PART I

Date
2013/06/16

Family name Szafron	Given name Duane	Initial(s) of all given names DA	Personal identification no. (PIN) Valid 15023
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☐ I hold a faculty position at an eligible Canadian college
(complete Appendices B1 and C)

☐ I do not or will not hold an academic appointment at a
Canadian postsecondary institution

Place of employment other than a Canadian postsecondary
Institution (give address in Appendix A)

APPOINTMENT AT A POSTSECONDARY INSTITUTION

Title of position Professor	Tenured or tenure-track academic appointment Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Department Computing Science	Part-time appointment <input type="checkbox"/> Full-time appointment <input checked="" type="checkbox"/>
Campus	
Canadian postsecondary institution Alberta	<ul style="list-style-type: none">For all non-tenured or non tenure-track academic appointment and Emeritus Professors, complete Appendices B & CFor life-time Emeritus Professor and part-time positions, complete Appendix C

ACADEMIC BACKGROUND

Degree	Name of discipline	Institution	Country	Date yyyy/mm
Bachelor's	Mathematics/Physics	Regina	CANADA	1975 / 05
Master's	Mathematics	Regina	CANADA	1975 / 10
Doctorate	Applied Mathematics	Waterloo	CANADA	1978 / 05

TRAINING OF HIGHLY QUALIFIED PERSONNEL

Indicate the number of students, fellows and other research personnel that you:

	Currently		Over the past six years (excluding the current year)		Total
	Supervised	Co-supervised	Supervised	Co-supervised	
Undergraduate	4		9	1	14
Master's			7	4	11
Doctoral	4	1	1		6
Postdoctoral					
Others					
Total	8	1	17	5	31

ACADEMIC, RESEARCH AND INDUSTRIAL EXPERIENCE (use one additional page if necessary)

Position held (begin with current)	Organization	Department	Period (yyyy/mm to yyyy/mm)
Professor	Alberta	Computing Science	1999/07
Vice Provost and Associate Vice President (Information Tech)	University of Alberta		2012/07
Associate Professor	University of Alberta	Computing Science	1994/07 to 1999/06
Visiting Associate Professor	University of Victoria	Computer Science	1989/07 to 1990/06
Assistant Professor	University of Alberta	Computing Science	1983/07 to 1994/06
Associate Professor	Portland State University	Computer Science	1981/07 to 1983/06
Assistant Professor	Portland State University	Mathematical Sciences	1978/07 to 1981/06

RESEARCH SUPPORT

Family name and initial(s) of applicant	Title of proposal, funding source and program, and time commitment (hours/month)	Amount per year	Years of tenure (yyyy)
List all sources of support (including NSERC grants and university start-up funds) held as an applicant or a co-applicant: a) support held in the past four (4) years but now completed; b) support currently held, and c) support applied for. For group grants, indicate the percentage of the funding directly applicable to your research. Use additional pages as required.			
a) Support held in the past 4 years			
Szafron, Duane	Generative Patterns - Higher Level Programming	28,700	2006
	NSERC	28,700	2007
	Discovery	28,700	2008
	80 hours/month	28,700	2009
		28,700	2010
Szafron, Duane	Research Allowance for Associate Dean	20,000	2008
	Faculty of Science, University of Alberta 30 hours/month	10,000	2009
b) Support currently held			
Szafron, D.	Believable Characters and Stories	44,000	2010
	NCE, GRAND	37,000	2011
	NCE	39,000	2012
	20 hours/month	30,000	2013
		30,000	2014
Szafron, Duane	Using Computer Poker as a Testbed for Solving Multiagent Decision Problems	29,000	2011
	NSERC	29,000	2012
	Discovery	29,000	2013
	10 hours/month	29,000	2014
		29,000	2015

Personal identification no. (PIN)

Valid 15023

Family name

Szafron

RESEARCH SUPPORT**Family name and initial(s)
of applicant****Title of proposal, funding source and program,
and time commitment (hours/month)****Amount
per year****Years of
tenure
(yyyy)**

List all sources of support (**including NSERC grants and university start-up funds**) held as an applicant or a co-applicant: a) support held in the past four (4) years but now completed; b) support currently held, and c) support applied for. For group grants, indicate the percentage of the funding directly applicable to your research. Use additional pages as required.

b) Support currently held

Duane Szafron

Computer Game Research
Office of the Provost, University of Alberta
10 hours/month

50,000
50,000

2012
2013

Highly Qualified Personnel (HQP)

Provide personal data about the HQP that you currently, or over the past six years, have supervised or co-supervised.

			Personal identification no. (PIN)	Family name
			Valid 15023	Szafron
Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Dustin Morrill	Undergraduate (In Progress)	Supervised 2013 -	Computer Poker	Summer Research Student
Jessica Yuen	Undergraduate (In Progress)	Supervised 2013 -	Believable Characters and Stories in Computer Games	16 Month Industrial Internship Student
Kirsten Svidal	Undergraduate (In Progress)	Supervised 2013 -	Believable Characters and Stories in Computer Games	Summer Research Student
Candy Pang	Doctoral (In Progress)	Supervised 2012 -	Software Architecture	PhD Student, University of Alberta
Kevin Schenk	Undergraduate (In Progress)	Supervised 2012 -	Believable Characters and Stories in Computer Games	16 Month Industrial Internship Student
Desai, Neesha	Doctoral (In Progress)	Supervised 2009 -	Emotion in Computer Games	PhD student, University of Alberta
Gibson, Richard	Doctoral (In Progress)	Supervised 2009 -	Regret Minimization in Games With Computer Poker as Testbed	PhD student, University of Alberta
Zhao, Richard	Doctoral (In Progress)	Supervised 2009 -	Behaviour Architectures in Computer Games	PhD student, University of Alberta
Hawkin, John	Doctoral (In Progress)	Co-supervised 2007 -	Action Abstraction in Extensive Form Games	PhD student, University of Alberta
Wei Li	Undergraduate (Completed)	Supervised 2012 - 2012	Animating Believable Characters in Computer Games	MA student (Fine Arts), University of Alberta
Adel Lari	Undergraduate (Completed)	Supervised 2011 - 2012	Believable Characters and Stories in Computer Games	unknown
Jamie Schmitt	Undergraduate (Completed)	Supervised 2011 - 2011	Animating Believable Characters in Computer Games	Graphic Artist and Research Assistant, University of Alberta
Church, Matthew	Undergraduate (Completed)	Supervised 2010 - 2011	Believable Characters and Stories in Computer Games	Games Developer - Electronic Arts
Graves, Eric	Undergraduate (Completed)	Supervised 2010 - 2011	Believable Characters and Stories in Computer Games	Games Developer - GamesSys, Edmonton
Miller, Robin	Undergraduate (In Progress)	Supervised 2009 - 2010	Believable Characters and Stories in Computer Games	Startup Tenjin Inc.
Sanchez, Ricardo	Master's (Completed)	Co-supervised 2008 - 2010	Applying Support Vector Machines to Discover Just-in-Time	Performance Engineer at Taghos Brazil
Sharifi, AmirAli	Master's (Completed)	Supervised 2008 - 2010	Generating Adaptive Companion Behaviors Using Re. Learning	PhD student, University of Alberta
Duncan, Jason	Undergraduate (Completed)	Supervised 2008 - 2009	Believable Characters and Stories in Computer Games	Startup - Tenjin inc.
Abou Risk, Nick	Master's (Completed)	Supervised 2007 - 2009	Using Counterfactual Regret Minimization to Create a Competi	Software Developer, Full Tilt Poker, Dublin, Ireland
Bostan, Babak	Master's (Completed)	Co-supervised 2007 - 2009	Predicting Homologous Signaling Pathways Using Machine Learn	Software Development Engineer, Microsoft

Highly Qualified Personnel (HQP)

Provide personal data about the HQP that you currently, or over the past six years, have supervised or co-supervised.

			Personal identification no. (PIN) Valid 15023	Family name Szafron
Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Desai, Neesha	Master's (Completed)	Supervised 2007 - 2009	Using Describers to Simplify ScriptEase	PhD student, University of Alberta
Kerr, Christopher	Master's (Completed)	Supervised 2007 - 2009	Intentional Dialogues: Leveraging Intent	Game Developer, Bioware, Edmonton
Schnizlein, David	Master's (Completed)	Co-supervised 2007 - 2009	State Translation in No-limit Poker	Researcher, Sandia National Labs, Livermore, USA
Trenton, Marcus	Master's (Completed)	Supervised 2007 - 2009	Quest Patterns for Story-Based Video Games	Game Developer, Capcom Game Studios
Yang, Yi	Master's (Completed)	Supervised 2007 - 2009	Code Optimization and Detection of Script Conflicts in Video	Software Developer, CorpAv Inc., Edmonton
Zhao, Richard	Master's (Completed)	Supervised 2007 - 2009	Applying Agent Modeling to Behaviour Patterns of Characters	PhD student, University of Alberta
Cutumisu, Maria	Doctoral (Completed)	Supervised 2003 - 2009	Using Behavior Patterns to Generate Scripts for CRPGs	Postdoctoral Student, Stanford
Alcantara, Ana	Undergraduate (Completed)	Supervised 2007 - 2008	Authoring Believable Characters & Stories in Computer Games	English Language Instructor, Japan
Friesen, Joshua	Undergraduate (Completed)	Supervised 2007 - 2008	Believable Characters and Stories in Computer Games	Software Developer, Saskatoon
Lam, Pandora	Undergraduate (Completed)	Co-supervised 2007 - 2008	Proteome Analyst	Programmer Analyst - University of Alberta
Wang, Peng	Master's (Completed)	Co-supervised 2006 - 2008	Hierarchical Prediction of Protein Function In the Gene Onto	Software Developer, Ideaca, Edmonton

1. Most Significant Contributions to Research and/or to Practical Applications

1.1 Using Poker as a Testbed for Artificial Intelligence Research.

In artificial intelligence, I work with M. Bowling, J. Schaeffer, and R. Holte on ways to represent and use imperfect information in agent decision problems. We use the game of poker as an application domain to test our ideas. Our poker-playing programs (Polaris & Hyberborean) are the best in the world as measured by their success in competitions with human experts and in annual computer poker competitions. In July 2007, at the first Man-Machine Poker Competition held at AAAI in Vancouver, our Polaris agent played a duplicate limit two-player Texas Hold'em match against two top professional poker players, Phil Laak and Ali Eslami and narrowly lost the match with 2 human wins, 1 Polaris win and 1 statistical draw (not a statistically significant win based on analysis of all hands played). However, in July 2008, Polaris won the Second Man-Machine Poker Competition held in conjunction with the World Series of Poker in Las Vegas, by winning 3 matches, drawing 1 match and losing 2 matches (a statistically significant win). This project has received a lot of attention, including a half page article in the New York Times and extensive television coverage. It was also commercialized as the popular and critically acclaimed Poker Academy. Our recent research results are published in papers: 7, 8, 10, 11, 12, 14, 19, 23, 24, and 28. We have published in the highest-impact venues for Artificial Intelligence research, including the journal Artificial Intelligence, where the seminal computer poker paper appeared: **D. Billings, A. Davidson, J. Schaeffer & D. Szafron, The challenge of poker, Artificial Intelligence 134 (1-2), 2002, 201-240 (264 citations)**. The other papers have appeared in the highest impact conferences such as: **D. Billings, N. Burch, A. Davidson, R. Holte, J. Schaeffer, T. Schauenberg, and D. Szafron, Approximating Game-Theoretic Optimal Strategies for Full-scale Poker, IJCAI, 2003, (Distinguished Paper Award) pp. 661-675 (204 citations)**. Our research group, the Computer Poker Research Group (CPRG) is the most cited academic computer poker research group in the world and a general Google search for "poker research" cites us first.

1.2 Generating Believable Characters and Stories in Virtual Worlds.

Creating realistic artificially-intelligent characters is seen as one of the major challenges of the commercial games industry. Historically, character behaviour has been specified using simple finite state machines and, more recently, by AI scripting languages. These languages are relatively "simple", in part because the language has to serve three user communities: game designers, game programmers, and consumers - each with different levels of programming experience. The scripting often becomes unwieldy, given that potentially hundreds (thousands) of characters need to be defined, the characters need non-trivial behaviours, and the characters have to interface with the plot constraints. We have developed a model for AI scripting called ScriptEase. We have shown that it is possible for game designers with no programming skills or training to use ScriptEase to generate all of the scripting code that is used in story-based computer games. This includes, all interactions of the player character (PC) with game world objects (encounter patterns), interactive collaborative interruptible and resumable behaviors of non-player characters (NPCs) that incorporate learning (behavior patterns), scripts that control game dialogue (dialogue patterns) and scripts that control all of the quests and the plot of the story (quest patterns). We have implemented this system and validated our conclusion that it is successful using a series of published case studies, user studies and the successful use of this tool in Computer Games courses at the University of Alberta over the past 10 years. We have pioneered behavior capture as an alternate way for designers to teach NPCs to behave more believably and begun fundamental research about the way that non-verbal, non-facial cues can be used to communicate emotion in video games.

Contributions: 1, 3, 6, 9, 13, 15, 17, 18, 20, 21, 22, 25, and 26, describe our approach of automatically generating scripting code for games. Our 100,000-line Java implementation of ScriptEase for NWN is available on the internet and has been downloaded over 10,000 times since May 2005. It has also been used in high school English classes to produce interactive short stories (games), by students

Duane Szafron

who did not know how to program. The results of these experiments appeared in Education and Social Science venues, including the highly respected journal, Computers and Education.

1.3 Bioinformatics: Using Machine Learning to Predict Important Protein Attributes.

Our goal was to develop a robust high performance web-based framework for proteomics, resulting in series of important discoveries and a set of tools and databases that are being used by Molecular Biologists all over the world. The tools are: Proteome Analyst, Pathway Analyst and BASys. The database is PA-GOSUB. Between July 1, 2005 and June 30 2006, 645,110 proteins coming from 975 different sites around the world were analyzed by Proteome Analyst. Between July 1, 2007 and June 30, 2008, the number had risen to 2.2 million per year and the number held steady for 2009 and into 2010. We shut down the servers in 2011 as our research interests shifted and other servers became available. Our discoveries included new algorithms for: protein subcellular location prediction, protein sequence alignment (FastLSA), natural language processing (NLP) of biological abstracts using synonym resolution and term generalization, protein function prediction using inheritance hierarchies of protein attributes, as well as new techniques for explaining predictions. Our discoveries were reported in: 2 and 5. A previous paper, **Z. Lu**, D. Szafron, R. Greiner, P. Lu, D.S. Wishart, **B. Poulin**, **J. Anvik**, C. Macdonell and **R. Eisner**, Predicting Subcellular Localization of Proteins using Machine-Learned Classifiers, Bioinformatics, 20 (4), 2004, 547-556, described the world's most accurate predictor of the subcellular localization of a protein in a cell (nucleus, cytoplasm, etc.) and has **272 citations** (Google Scholar).

1.4 Generating Parallel Programs Using Design Patterns.

Our goal was to develop a mechanism for programmers with little parallel programming experience to transform their sequential programs into parallel ones. A programmer selects a parallel design pattern from a palette of choices and the system automatically generates a template containing parallel code. The programmer then fills in the application specific sequential portions of the code. A component of this research is described in: 4. This work appeared in the highest-impact venues for parallel programming including: Transactions on Programming Languages and Systems (TOPLAS), Parallel Computing, the Journal of Parallel and Distributed Computing and high impact conferences: ICCP, PPOPP and EuroPar. The early paper, **S. MacDonald**, **J. Anvik**, **S. Bromling**, J. Schaeffer, D. Szafron & **K. Tan**, From Patterns to Frameworks to Parallel Programs, Parallel Computing, **28** (12), 2002, 1663-1683 has **92 citations**. We applied these results to parallelize bioinformatics applications in the web-based Proteome Analyst research project, described above. The generative design pattern idea also led directly to the ScriptEase Computer Games project also described above.

2. Research Contributions (since 2008)

Students I supervised or co-supervised are **bolded**. Graduate students / research staff with large contributions are listed first. Trainees with a smaller contribution are listed at the end. Faculty are listed in alphabetical order, after the primary trainee, except when they have made a larger than average contribution. Journal impact factors/ranks (**IF**, rank **at the time of publication**) from ISI are given. The categories used are: Computer Science – Interdisciplinary Applications: **CS-IA**, Software Engineering: **CS-SE**, Theory & Methods: **CS-TM**, Education and Educational Research: **ED**. Conference acceptance rates (**AR**) are listed.

1.1 Refereed Journal Articles:

1. M. Carbonaro, D. Szafron, **M. Cutumisu** and J. Schaeffer. Computer-game construction: A gender-neutral attractor to Computing Science. Computers & Education, **55**, 2010, 1098–1111 (IF = 2.19, rank 6/112 = 5.4% in ED)
2. **B. Bostan**, R. Greiner, D. Szafron and P. Lu. Predicting Homologous Signaling Pathways Using Machine Learning. Bioinformatics, **25**, 2009, 2913-2920. (IF = 5.039, 1/92 = 1.1% in CS-IA)

Duane Szafron

3. **J. Siegel** and D. Szafron. Dialogue Patterns - A Visual Language For Dynamic Dialogue, Journal of Visual Languages and Computing, **20** (3), 2009, 196-220. (IF = 0.644, 55/84 = 65.5% in CS-SE)
4. **S. MacDonald, K. Tan**, J. Schaeffer and D. Szafron. Deferring Design Pattern Decisions and Automating Structural Pattern Changes using a Design-Pattern-Based Programming System. ACM TOPLAS, **31** (3), 2009, 9.1 - 9.48. (IF = 1.102, 28/82 = 34.1% in CS-SE)
5. **A. Fyshe, Y. Liu**, D. Szafron, R. Greiner and P. Lu. Improving subcellular localization prediction using text classification and the gene ontology. Bioinformatics **24**, 2008, 2512-2517. (IF = 5.039, 1/92 = 1.1% in CS-IA)
6. M. Carbonaro, **M. Cutumisu**, H. Duff, S. Gillis, **C. Onuczko, J. Siegel**, J. Schaeffer, **A. Schumacher**, D. Szafron and **K. Waugh**. Interactive Story Authoring: A Viable Form of Creative Expression for the Classroom. Computers and Education **51** (2), 2008, 687 - 707. (IF = 1.602, 8/105 = 7.6% in ED)

1.2 Other Refereed Contributions (Refereed Conferences and Refereed Book Chapters):

7. D. Szafron, **R. Gibson**, and N. Sturtevant, A Parameterized Family of Equilibrium Profiles for Three-Player Kuhn Poker, Proceedings of the 12th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2013), St. Paul, USA, May, 2013, 247-254. (22.88% = 140/612 AR)
8. **R. Gibson**, N. Burch, M. Lanctot, and D. Szafron, Efficient Monte Carlo Counterfactual Regret Minimization in Games with Many Player Actions, Proceedings of Twenty-Sixth Annual Conference on Neural Information Processing Systems (NIPS), Lake Tahoe, USA, December, 2012, 1889-1897. (25.22% = 370/1467 AR)
9. **N. Desai**, D. Szafron, Enhancing the Believability of Character Behaviors Using Non-Verbal Cues, Proceedings of the Eighth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE), Stanford, USA, October, 2012, 130-135. (54.2% = 32/59 AR)
10. **J. Hawkin**, R. Holte and D. Szafron, Using sliding windows to generate action abstractions in extensive-form games, Proceedings of Twenty-Sixth National Conference on Artificial Intelligence (AAAI'12), Toronto, Canada, July, 2012, 1924-1930. (26.04% = 294/1129 AR)
11. **R. Gibson**, M. Lanctot, N. Burch, D. Szafron and M. Bowling, Generalized Sampling and Variance in Counterfactual Regret Minimization, Proceedings of Twenty-Sixth National Conference on Artificial Intelligence (AAAI'12), Toronto, Canada, July, 2012, 1355-1361. (26.04% = 294/1129 AR)
12. **R. Gibson**, and D. Szafron, On Strategy Stitching in Large Extensive Form Multiplayer Games, Proceedings of Twenty-Fifth Annual Conference on Neural Information Processing Systems (NIPS), Granada, Spain, December, 2011, 100-108. (21.79% = 305/1400 AR)
13. **R. Zhao** and D. Szafron. Generating Believable Virtual Characters Using Behavior Capture and Hidden Markov Models. Proceedings of Advances in Computer Games 13 Conference (ACG 2011), Tiltburg, Netherlands, November, 2011, Lecture Notes in Computer Science Volume 7168, 342-353, 2012. (80.56% = 29/36 AR).
14. **J. Hawkin**, R. Holte and D. Szafron, Automated Action Abstraction of Imperfect Information Extensive-Form Games, Proceedings of Twenty-Fifth National Conference on Artificial Intelligence (AAAI'11), San Francisco, USA, August, 2011, 681-687. (24.8% = 242/975 AR)
15. **N. Desai** and D. Szafron, Descriptions - a viable choice for video game authors, Proceedings of the Sixth international Conference on Digital Games (FDG), Bordeaux, France, June, 2011, 268-270. (53.3% = 57/107 AR)
16. **R. N. Sanchez**, J. N. Amaral, D. Szafron, M. Pirvuz and M. Stoodley. Using Support Vector Machines to Learn How to Compile a Method. SBAC-PAD, 2010, 6 ms. IEEE. (30% = 30/100 AR)
17. **A. Sharifi, R. Zhao** and D. Szafron. Learning Companion Behaviors Using Reinforcement Learning in Games. AIIDE, 2010, 6 ms. AAAI Press. (29.8% = 17/57 AR – for papers with talk presentation)

Duane Szafron

18. **M. Trenton**, D. Szafron, **J. Friesen** and **C. Onuczko**. Quest Patterns for Story-based Computer Games. *AIIDE*, 2010, 6 ms. AAAI Press. (61.4% = 35/57 AR – for papers with poster presentation)
19. **N. Abou Risk** and D. Szafron. Using Counterfactual Regret Minimization to Create Competitive Multiplayer Poker Agents. *AAMAS*, 2010, 159-166. (23.8% = 163/685 AR)
20. **M. Cutumisu** and D. Szafron. An Architecture for Game Behavior AI: Behavior Multi-Queues. *AIIDE*, 2009, 8 ms. (43.9% = 18/41 AR for papers with talk)
21. **R. Zhao** and D. Szafron. Learning Character Behaviors using Agent Modeling in Games. *AIIDE*, 2009, 7 ms. (68.3% = 28/41 AR– for papers with poster presentation)
22. **C. Kerr** and D. Szafron, Supporting Dialogue Generation for Story-Based Games. *AIIDE*, 2009, 7 ms. (68.3% = 28/41 AR– for papers with poster presentation)
23. **D. Schnizlein**, M. Bowling and D. Szafron, Probabilistic state translation in extensive games with large action sets. *IJCAI*, 2009, 278-284. (25.6% = 331/1291 AR)
24. K. Waugh, **D. Schnizlein**, M. Bowling and D. Szafron. Abstraction Pathologies in Extensive Games. *AAMAS*, 2009, 781-788. (22.3% = 132/591 AR)
25. **C. Onuczko**, D. Szafron and J. Schaeffer. Stop Getting Side-Tracked by Side-Quests. In *AI Game Programming Wisdom 4*, Editor S Rabin. Charles River Media (2008), 513-528.
26. **M. Cutumisu**, D. Szafron, M. Bowling and R. S. Sutton. Agent Learning using Action-Dependent Learning Rates in CRPGs. *AIIDE*, 2008, 22-29. (40% = 32/80 AR)
27. R. Niewiadomski, J. N. Amaral and D. Szafron. The MAP3S Static-and-Regular Mesh Simulation and Wavefront Parallel-Programming Patterns. *ICPP*, 2008, 571-577. (30.8% = 81/263 AR)
28. M. Bowling, M. Johanson, N. Burch and D. Szafron. Strategy Evaluation in Extensive Games with Importance Sampling. *ICML*, 2008, 72-79. (27.1% = 158/583 AR)

Contributions to practical applications of knowledge

In 1995, I started a Bioinformatics company, Biotools Inc. with J. Schaeffer (Professor of Computing Science), D. Wishart (then - Bristol-Meyers Squib Chair of Pharmacy) and B. Sykes (Professor of Biochemistry). This company has produced commercial software products called PepTool, GeneTool and ChromaTool for protein and DNA analysis. The company had more than 3 million dollars of capitalization and distributed more than one million dollars worth of software. BioTools employed more than 15 people, but its assets were since sold and the company was disbanded. However, in 2000, BioTools created a spin-off company, called Chenomx (<http://www.chenomx.com>) that continues to combines state-of-the-art spectroscopic technology for the identification of metabolic markers with advanced AI algorithms to provide analysis of biological samples. The Chenomx software helps scientists correlate metabolic responses with pathology, toxicity, drug efficacy, and genetics. We also commercialized the artificial intelligence research from the University of Alberta computer poker research group (CPRG) into commercial software that allows users to learn how to play poker at a high-level of skill by playing against tunable “bots” that use artificial intelligence to play poker. Poker Academy was recently sold to a large corporation.

3. Other Evidence of Impact

- Winner of Digital Alberta Award for Best Digital Media Leader, 2013
- Theme Leader and Member of the GRAND NCE Research Management Committee April 2012 – March 2013
- In July 2008, our Computer Poker Research Group (CPRG) competed in the first Annual Computer Poker Competition (ACPC) that was held at AAAI. There were five different events. We had two 1st place finishes, two 2nd place finishes and one 3rd place finish. In July 2008 our computer poker bot, Polaris won the 2nd man-machine showdown with a record of 3-2-1. In July 2009, there were 25 agents in the ACPC from 7 countries, including entries from Carnegie Mellon University. There were six events. We had four 1st place finishes and two 2nd place finishes. In 2010, 2011 and 2012 we continued this pace. In the five year of competition, we have had fifteen 1st place finishes, eight 2nd place finishes and five 3rd place finishes in the 29 events. Although these entries were created by the whole CPRG

Duane Szafron

team, my supervised students were the principal authors of the programs that were entered in the two multi-player events (three or more players) each year, where we finished 1st in both multi-player events every year.

- Many NSERC discovery and strategic grant reviews in the past 5 years, as well as being the principal speaker at three NSERC Discovery Grant Workshops with more than 60 attendees at each one, since I had served on the NSERC Grant Selection committee previously from 2001 to 2003.

- One external tenure review in the last 5 years

- Referee for the following journals: Journal of Artificial Intelligence, Nucleic Acids Research Journal, Computers and Education

- Referee and/or Program Committee member for the following conferences: AAMAS, AIIDE, IJCAI, Foundations of Digital Games, International Advances in Computer Games Conference including a **best Reviewer** award for the AIIDE 2011 Conference.

- Various interviews with press about computer poker and females in Computing Science

- Journal article #1 published in Nov 2010 was identified by the popular press in 2011 and was described in dozens of publications including: U of A Express News, Science Daily, UPI.com (Science News), Physorg.com, Village Gamer, and Scitable by Nature Education.

- University of Alberta Graduate Student Association Award for Excellence in Supervision - 2006

5. Contributions to the Training of HQP (Since 2008)

Of the 14 undergraduate students in the HQP table, 9 of them were 16-month full-time interns (IIPs) in between their 3rd and 4th years of undergraduate study. They conducted research and built software systems to support research. None of my ugrad students were course project students: they all worked full time for at least 4 months. For example, Ana Alcantara was an Arts student who supported our research by working full-time for 8 months as a Computer Games author before completing her BA degree. Jamie Schmitt and Wei Li were Industrial Design and Fine Arts majors respectively who worked full time in the summers to do 3D animation in support of our research. Due a term as Vice Dean of the Faculty of Science, I did not have many PhD students in the past six years and so there were few PhD graduates. However, I took more PhD students when I finished this role and now have 5.

“High Quality” in HQP is very important and I provide my students an opportunity to **publish** in peer-reviewed venues. Since 2008, all my former graduate students and most of my former IIP undergraduate students have at least one co-authored peer-refereed publication in a good venue. My students have won many awards. For example, since 2008, I have supervised or co-supervised 6 NSERC postgraduate scholarship holders (Desai, Gibson, Hawkin, Cutumisu, Trenton, Abou Risk).



**SEND ONE
ORIGINAL ONLY
DO NOT
PHOTOCOPY**

**APPENDIX A
Personal Data
(Form 100)**

Complete this appendix (i) if you are an applicant or co-applicant applying for the first time; (ii) if you need to update information submitted with a previous application; or (iii) if you do not hold an appointment at a Canadian postsecondary institution. For updates, include only the revised information in addition to the date, your name and your PIN.

This information will be used by NSERC primarily to contact applicants and award holders. It may also be used to identify prospective reviewers and committee members, and to generate statistics. It will not be seen or used in the adjudication process.

Date 2013/06/16			
Family name Szafron	Given name Duane	Initial(s) of all given names DA	Personal identification no. (PIN) Valid 15023
Position and complete mailing address if your primary place of employment is not a Canadian postsecondary institution or if your current mailing address is temporary Department of Computing Science University of Alberta Edmonton AB T6G2E8 CANADA			If address is temporary, indicate: Starting date Leaving date
Telephone number (780) 4925468	Facsimile number (780) 4921071	E-mail address dszafron@ualberta.ca	
Telephone number (alternate) (780) 4922253	Give an alternate telephone number only if you can be reached at that number during business hours.		Gender (completion optional) <input checked="" type="checkbox"/> Male <input type="checkbox"/> Female
LANGUAGE CAPABILITY			
English Read <input checked="" type="checkbox"/> Write <input checked="" type="checkbox"/> Speak <input checked="" type="checkbox"/>			
French Read <input type="checkbox"/> Write <input type="checkbox"/> Speak <input type="checkbox"/>			
I wish to receive my correspondence: in English <input checked="" type="checkbox"/> in French <input type="checkbox"/>			
AREA(S) OF EXPERTISE			
Provide a maximum of 10 key words that describe your area(s) of expertise. Use commas to separate them. If you have expertise with particular instruments and techniques, specify which one(s). Computer Games, Machine Learning, Programming Languages, Game Theory, Programming Environments, Generative Design Patterns, Bioinformatics, Parallel Programming Systems			Research subject code(s) Primary 2705
			Secondary 2800



Appendix D (Form 100) Consent to Provide Limited Personal Information About Highly Qualified Personnel (HQP) to NSERC

NSERC applicants are required to describe their contributions to the training or supervision of highly qualified personnel (HQP) by providing certain details about the individuals they have trained or supervised during the six years prior to their current application. HQP information must be entered on the Personal Data Form (Form 100). This information includes the trainee's name, type of HQP training (e.g., undergraduate, master's, technical etc.) and status (completed, in-progress, incomplete), years supervised or co-supervised, title of the project or thesis, and the individual's present position.

Based on the federal *Privacy Act* rules governing the collection of personal information, applicants are asked to obtain consent from the individuals they have supervised before providing personal data about them to NSERC. In seeking this consent, the NSERC applicant must inform these individuals what data will be supplied, and assure them that it will only be used by NSERC for the purpose of assessing the applicant's contribution to HQP training. To reduce seeking consent for multiple applications, applicants will only need to seek consent one time for a six-year period. If the trainee provides consent by e-mail, the response must include confirmation that they have read and agree to the text of the consent form.

When consent cannot be obtained, applicants are asked to not provide names, or other combinations of data, that would identify those supervised. However, they may still provide the type of HQP training and status, years supervised or co-supervised, a general description of the project or thesis, and a general indication of the individual's present position if known.

An example of entering HQP information on Form 100 (with and without consent):

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Consent Received from Marie Roy				
Roy, Marie	Undergraduate (Completed)	Supervised 1994 - 1997	Isotope geochemistry in petroleum engineering	V-P (Research), Earth Analytics Inc., Calgary, Alberta
Consent Not Obtained from Marie Roy				
(name withheld)	Undergraduate (Completed)	Supervised 1994 - 1997	Isotope geochemistry	research executive in petroleum industry - western Canada

Consent Form

Name of Trainee	
Applicant Information	
Name Szafron, Duane DA	
Department Computing Science	Postsecondary Institution Alberta
I hereby allow the above-named applicant to include limited personal data about me in grant applications submitted for consideration to NSERC for the next six years. This limited data will only include my name, type of HQP training and status, years supervised or co-supervised, title of the project or thesis and, to the best of the applicant's knowledge, my position title and company or organization at the time the application is submitted. I understand that NSERC will protect this data in accordance with the <i>Privacy Act</i> , and that it will only be used in processes that assess the applicant's contributions to the training of highly qualified personnel (HQP), including confidential peer review.	
Trainee's signature	Date
Note: This form must be retained by the applicant and made available to NSERC upon request.	