Natural Sciences and Engineering Research Council of Canada | Conseil de recherches en sciences naturelles et en génie du Canada

FORM 100
Personal Data Form
PART I

Date: 2013/04/09

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Penn	Gerald	GB	Valid 242985

☐ 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: Associate Professor

Department: Computer Science (St. George Campus)

Campus: St. George

Canadian postsecondary institution: Toronto

Tenured or tenure-track academic appointment — Yes [X] No [ ]

Part-time appointment [ ] Full-time appointment [X]

- For all non-tenured or non tenure-track academic appointment and Emeritus Professors, complete Appendices B & C
- For 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 and Computer Science	University of Chicago	UNITED STATES	1991 / 06
Master's	Computational Linguistics	Carnegie Mellon University (US)	UNITED STATES	1993 / 12
Doctorate	Language and Information Technology	Carnegie Mellon University (US)	UNITED STATES	2000 / 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)		
	Supervised	Co-supervised	Supervised	Co-supervised	Total
Undergraduate	3		9		12
Master's	1		7		8
Doctoral	5	1	2	1	9
Postdoctoral			1	1	2
Others					
Total	9	1	19	2	31

Personal information collected on this form and appendices will be stored in the Personal Information Bank for the appropriate program.

PROTECTED WHEN COMPLETED

Version française disponible

Completed

Personal identification no. (PIN)	Family name
Valid 242985	Penn

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

Position held (begin with current)	Organization	Department	Period (yyyy/mm to yyyy/mm)
Associate Professor	Toronto	Computer Science (St. George Campus)	2005/07
Fellow of Computer Science	University of Trinity College	Faculty of Arts	2012/07
Associate Chair, Research and Industrial Relations	University of Toronto	Computer Science	2011/07
Visiting Researcher	NASA Ames Research Center	Human Systems Integration Division	2011/04 to 2011/07
Visiting Researcher	Stanford University	Center for Study of Lang. & Information	2011/04 to 2011/07
Visiting Researcher	University of California at Berkeley	International Computer Science Institute	2011/04
Visiting Professor	Stanford University	Computer Science and Linguistics	2011/01 to 2011/03
Associate Member	University of Trinity College	Faculty of Arts	2009/07 to 2012/06
Adjunct Professor	University of Waterloo	Faculty of Mathematics	2009/07

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

Position held (begin with current)	Organization	Department	Period (yyyy/mm to yyyy/mm)
Chief Scientist	University of Toronto	Knowledge Media Design Institute	2009/07 to 2011/06
Visiting Research Professor	University of Southern California	Information Sciences Institute	2007/01 to 2007/07
Visiting Associate Professor	University of Illinois at Urbana/Champaign	Beckman Institute	2006/07 to 2006/12
Assistant Professor	University of Toronto	Computer Science	2001/01 to 2005/06
Member of Technical Staff	Bell Laboratories	Language Modeling Research	1999/11 to 2001/01
Research Scientist	Eberhard-Karls-Universitaet Tuebingen	Computational Linguistics	1996/06 to 1999/08
Visiting Researcher	Rijksuniversiteit Utrecht	Institute for Speech and Language (OTS)	1994/09 to 1994/12
Research Assistant	Carnegie Mellon University	Philosophy	1992/08 to 1993/08
Research Programmer	University of Chicago	Oriental Institute	1992/05 to 1995/07
Laboratory Assistant / Tutor	University of Chicago	Computer Science	1991/03 to 1991/06

Personal identification no. (PIN)	Family name
Valid 242985	Penn

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

Position held (begin with current)	Organization	Department	Period (yyyy/mm to yyyy/mm)
Teaching Assistant	University of Chicago	Mathematics	1990/09 to 1991/03
Speech/Sound Analyst	University of Chicago	Otolaryngology	1986/09 to 1987/03
Programmer	Mid-Ohio Pathology		1985/07 to 1990/09

PROTECTED WHEN COMPLETED

Personal identification no. (PIN)	Family name
Valid 242985	Penn

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

Penn, GB	Towards True Natural Language Semantics NSERC Discovery Grant 10 hours/month	28,000 28,000 28,000 28,000 28,000	2005 2006 2007 2008 2009
Penn, GB	Writing Systems: their classification, structure and use Ontario Ministry of Enterprise, Opportunity and Innovation Premier's Research Excellence Award 10 hours/month	21,140 21,565 21,998 42,225 43,072	2006 2007 2008 2009 2010
Hirst, G	Towards Articulatory-based Adaptation in Dysarthric Speech Recognition Bell Canada University Labs Research Partnership Program 5 hours/month	79,000 (40%) 87,000 (40%) 87,000 (40%)	2007 2008 2009
Hirst, G	Towards Articulatory-based Adaptation in Dysarthric Speech Recognition NSERC Collaborative Research and Development Grant (CRDPJ) 5 hours/month	47,713 (40%) 67,320 (40%) 60,820 (40%)	2008 2009 2010

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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			
Penn, GB	Speech Recognition for the Lecture Environment Faculty of Arts and Science, University of Toronto Instructional Initiatives Grant 5 hours/month	1,000	2009
Penn, GB	Supplementary Funding, NECTAR: Network for Effective Collaboration Technologies through Advanced Research NSERC Strategic Network Enhancement Initiative 10 hours/month	14,375	2009
Penn, GB	Theory and Implementation of a Head-driven Phrase Structure Grammar for Persian France-Canada Foundation France-Canada Foundation Fellowship 10 hours/month	3,000(100%) 3,000(100%) 4,000(100%)	2009 2010 2011
Penn, GB	Lattice Representations for Natural Language Understanding (Viktoriya Krakovna) NSERC Undergraduate Student Research Award 5 hours/month	4,500	2009

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a) Support held in the past 4 years			
Penn, GB	Task-embedded Evaluation of Speech Summarizers (Qi Yang) NSERC Undergraduate Student Research Award 5 hours/month	4,500	2009
Penn, GB	Massively Parallel Computing in Natural Language Technology NSERC Research Tools and Instruments - Category 1 40 hours/month	140,843 (100%)	2010 2011
Penn, GB	Approximate Alignment in Machine Transliteration (Magali Boizot-Roche) NSERC Undergraduate Student Research Award 5 hours/month	4,500	2010
Penn, GB	GRAND industrial contributions: cash (not including in-kind and seconded research staff support) CAE, Inc. 20 hours/month	9,000	2011 2012

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a) Support held in the past 4 years			
Penn, GB	Speech-to-speech Machine Translation for Canadian Aboriginal Languages MITACS ELEVATE 5 hours/month	65,000	2011 2012
Penn, GB	Modularity in Constraint Programming Languages (Debbie Lo) NSERC Undergraduate Student Research Award 5 hours/month	4,500	2011
Penn, GB	Sentiment Analysis in the Financial Domain (Shunan Zhao) University of Toronto University of Toronto Excellence Award 5 hours/month	4,500	2011
Penn, GB	Detecting feature-film copyright violations with audio features (Matthew Giamou) University of Toronto Engineering Science Research Opportunity Program 5 hours/month	3,000	2011

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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			
Penn, GB	GRAND Supplementary Equipment Funding Networks of Centres of Excellence NCE 5 hours/month	10,000	2011
b) Support currently held			
Fiume, E.	Construction of a Centre for Collaborative Interactive Digital Media CFI New Initiatives Fund 10 hours/month	2,400,000 (30%)	2009 2010 2011 2012 2013
Booth, K. (PI) et al.	GRAND: Graphics, Animation and New Media Networks of Centres of Excellence NCE 60 hours/month	4,650,000 (1%) 4,650,000 (1%) 4,650,000 (1%) 4,650,000 (1%) 4,650,000 (1%)	2010 2011 2012 2013 2014
Penn, GB	GRAND post-secondary contributions (in-kind) Carleton University Library	405,000 55,000 55,000 55,000 55,000	2010 2011 2012 2013 2014

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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			
Penn, GB	Spoken Language Processing in Ecologically Valid Contexts NSERC Discovery Grant 10 hours/month	25,000 25,000 25,000 25,000 25,000	2010 2011 2012 2013 2014
Penn, GB	Corpora of Non-Linguistic Symbol Systems Social Science and Humanities Research Council (SSHRC) Insight Development Grant 5 hours/month	33,604	2011 2012 2013 2014
Penn, GB	Mathematical Modelling for the Evaluation of Automated Speech Recognition Systems U.S. Army Research, Development and Engineering Command Short-Term Investigative Research Award 10 hours/month	48,674	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 242985	Penn

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Sahney, Aakash	Undergraduate (In Progress)	Supervised 2012 -	spoken information retrieval	Baccalaureate candidate
Bhargava, Aditya	Doctoral (In Progress)	Supervised 2011 -	Statistical dialogue modelling	Doctoral candidate
Corlett, Eric	Doctoral (In Progress)	Supervised 2011 -	Probabilistic modelling in mathematical linguistics	Doctoral candidate
Giamou, Matthew	Undergraduate (In Progress)	Supervised 2011 -	spoken information extraction	Baccalaureate candidate
Zhao, Shunan	Undergraduate (In Progress)	Supervised 2011 -	financial sentiment analysis	Baccalaureate candidate
Jackie Chi-Kit	Doctoral (In Progress)	Supervised 2010 -	distributional semantics and summarization	Doctoral candidate
Siavash Kazemian	Doctoral (In Progress)	Supervised 2010 -	spoken information retrieval	Doctoral candidate
Abdurrahman Samir	Doctoral (In Progress)	Co-supervised 2008 -	acoustic modelling	Doctoral candidate
Michael Reimer	Master's (In Progress)	Supervised 2008 -	language modelling	Master's Candidate
Fowler, Timothy	Doctoral (In Progress)	Supervised 2006 -	Categorial proof nets	Doctoral candidate
Anthony McCallum	Master's (Completed)	Supervised 2011 - 2012	An Ecologically Valid Evaluation of Speech Summarization in	Programmer, Amazon Corporation
Mengistu, Kinfe	Postdoctoral (Completed)	Supervised 2011 - 2012	speech-to-speech machine translation	Research scientist, Nuance
Lo, Debbie	Undergraduate (In Progress)	Supervised 2011 - 2011	constraint programming languages	Baccalaureate candidate
Bell, Sean	Undergraduate (Completed)	Supervised 2010 - 2011	Detecting Errors in Patent Claims with Natural Language Proc	Postgraduate student, Cornell University
Eric Corlett	Master's (Completed)	Supervised 2009 - 2011	An Exact A* Method for Solving Letter-Substitution Ciphers	Doctoral Candidate
Michael Tao	Undergraduate (Completed)	Supervised 2009 - 2011	constraint-based underspecified semantical representations	Master's candidate
Thanh Pham	Master's (Completed)	Supervised 2009 - 2011	An Empirical Comparison of Three Audio Fingerprinting	Start-up entrepreneur, Vietnam
Magali Boizot-Roche	Undergraduate (Completed)	Supervised 2010 - 2010	approximate alignment in machine transliteration	Postgraduate student, Universitaet Heidelberg
Matthew Skala	Postdoctoral (Completed)	Co-supervised 2009 - 2010	approximate representations of lattice joins	Postdoctoral Fellow, University of Manitoba
Qi Yang	Undergraduate (Completed)	Supervised 2009 - 2010	acoustic modelling	Postgraduate student, University of Michigan

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 242985	Penn

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Viktoriya Krakovna	Undergraduate (Completed)	Supervised 2009 - 2010	lattice representations	Postgraduate student, Harvard University
Jackie Chi-Kit	Master's (Completed)	Supervised 2008 - 2010	Parsing German Topological Fields with Probabilistic Context	Doctoral Candidate
Farahmand, Rouzbeh	Master's (Completed)	Supervised 2007 - 2010	Flexible Structural Analysis of Near-Meet-Semilattices for U	Research Programmer, University of Toronto
Collins, Christopher	Doctoral (Completed)	Co-supervised 2004 - 2010	Interactive Visualizations of Natural Language	Assistant Professor, University of Ontario Institute of Tech
Zhu, Xiaodan	Doctoral (Completed)	Supervised 2004 - 2010	Summarizing Spoken Documents through Utterance Selection	Research Scientist, NRC Ottawa
Nicolas Trahan	Master's (Not Completed)	Supervised 2009 - 2009	semantic interpretation of mathematical textbooks	unknown
Eric Corlett	Undergraduate (Completed)	Supervised 2008 - 2009	speech recognition in lecture environments	Master's Candidate
(Name withheld)	Undergraduate (Completed)	Supervised 2008 - 2009	Probabilistic programming languages	unknown
Kazemian, Siavash	Master's (Completed)	Supervised 2007 - 2009	A Critical Assessment of Spoken Utterance Retrieval through	Doctoral candidate
Munteanu, Cosmin	Doctoral (Completed)	Co-supervised 2003 - 2009	Usable Transcriptions of Webcast Lectures and Presentations	Research Scientist, NRC Fredericton
Yuecheng Zhang	Undergraduate (Completed)	Supervised 2006 - 2007	Speech recognition for lectures and presentations	Programmer, Microsoft
Demko, Michael	Master's (Completed)	Supervised 2005 - 2007	Statistical Parsing with Context-free Filtering Grammar	Programmer, NexJ Systems

1 Most Significant Research Contributions

[P1] **Carpenter, B. and G. Penn (1996) Efficient Parsing of Compiled Typed Attribute Value Logic Grammars. In H. Bunt and M. Tomita, eds.,** *Recent Advances in Parsing Technology***, pp. 145–168. Kluwer.** This is a précis of my M.Sc. thesis, presenting the method underlying the Attribute Logic Engine (ALE), a logic programming language and natural language parsing/generation system based on typed feature structures. Since its first release in 1992, ALE has been used by over 200 universities and industrial research centres for every level of linguistic processing from phonological segmentation to discourse analysis. Approaching its version 4.0 release this year, it remains the most portable and widely used feature-structure-based NLP system.

[P2] **Buszkowski, W. and G. Penn (1990) Categorial Grammars Determined from Linguistic Data by Unification.** *Studia Logica* **49 (December), pp. 431–454.** This paper presented the first algorithm for automatically learning categorial grammars (an approach to grammar based on linear logic) from data. It also provided some theoretical results on the tractability of this problem. This topic, now known as Buszkowski-Penn Learning Theory, has been further developed over the last 19 years by several doctoral theses and funded research projects in the Netherlands, Britain, and the U.S., which continues today.

[P3] P**enn, G., J. Hu, H. Luo, and R. McDonald (2001) Flexible Web Document Analysis for Delivery to Narrow-Bandwidth Devices.** *Proceedings of the Sixth International Conference on Document Analysis and Recognition (ICDAR 01)***, Seattle, pp. 1074–1078.** This paper presented what is now the most widely used baseline for evaluating statistical methods for extracting semantically tabular content from HTML pages. It also presented a method for delivering terse, navigable summaries of the semantically extracted structure to wireless handheld devices. The baseline was used for several years in the shared tasks of the Document Analysis Systems Workshop on HTML Documents, and our implementation of the summarizer was licensed to Avaya Labs Research for further development.

[P24] This was the first longitudinal observational study of multi-touch tabletop use. It also contains the first linguistic analysis of tabletop text entry, finding statistically significant differences relative to entry on keyboard-video-mouse interfaces.

[P6] Bubble sets is a method for indicating multiple data relationships within a single visualization using isocontours. This paper introduces the method and demonstrates it in the context of understanding the output of a statistical machine translation system. It is now the *de facto* standard for visualizing syntax-directed machine translation output, and has inspired a number of related techniques within the information visualization community.

2 Research Contributions

Note: In the two research areas that I have mostly published in, computational linguistics and human-computer interaction, journals do not matter. The most prestigious venues for publication are, for CL, ACL-affiliated conferences and, for HCI, the annual CHI meeting. Full-length papers at these venues have 15–25% acceptance rates. Since 2007, I have published 17 full-length papers at these.

NSERC below refers to an NSERC Discovery Grant. NECTAR is the NSERC Strategic Network for Effective Collaboration Technologies through Advanced Research. ERA is my Ontario Early Researcher Award. CRD is the NSERC Collaborative R & D grant with Bell Canada. GRAND is the NCE for Graphics, Animation and New Media Design.

2.1 Refereed Journal Articles

[P4] **Zhu, X.,** C. Cherry and G. Penn (in press) A Graph-partitioning Framework for Aligning Hierarchical Topic Structures to Presentations. *IEEE Transactions on Audio, Speech and Language Processing*, 11 pages.

[P5] **Pham, T., M. Giamou** and G. Penn (2012) An Empirical Comparison of Three Audio Fingerprinting Methods in Music and Feature-length Film. *Canadian Acoustics* **40**:3, pp. 92–93. [GRAND]

[P6] **Collins, C.,** G. Penn and S. Carpendale (2009) Bubble Sets: Revealing Set Relations over Existing Visualizations. *IEEE Transactions on Visualization and Computer Graphics* **15**(6): pp. 1009–1016. [NECTAR]

[P7] **Collins, C.,** S. Carpendale and G. Penn (2009) DocuBurst: Visualizing Document Content Using Language Structure. *Computer Graphics Forum* **28**(3):1039–1046. [NECTAR]

2.2 Highly Selective Refereed Conference Proceedings

[P8] **Farahmand, R.** and G. Penn (2012) Flexible Structural Analysis of Near-Meet-Semilattices for Typed Unification-based Grammar Design. *Proceedings of the 24th International Conference on Computational Linguistics (COLING 2012)*, Mumbai, pp. 833–848. [NSERC]

[P9] **Cheung, J. C.-K.** and G. Penn (2012) Evaluating Distributional Models of Semantics for Syntactically Invariant Inference. *Proceedings of the 13th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2012)*, Avignon, pp. 33–43. [NSERC]

[P10] **Cheung, J. C.-K.** and G. Penn (2012) Unsupervised Detection of Downward-Entailing Operators By Maximizing Classification Certainty. *Proceedings of the 13th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2012)*, Avignon, pp. 696–705. [NSERC]

[P11] **Cheung, J. C.-K.** and G. Penn (2010) Utilizing Extra-sentential Context for Parsing. *Proceedings of the 2010 Conference on Empirical Methods in Natural Language Processing (EMNLP 2010)*, Boston, pp. 23–33. [NSERC]

[P12] **Zhu, X.,** C. Cherry and G. Penn (2010) Imposing Hierarchical Browsing Structures onto Spoken Documents. *Proceedings of the 23rd International Conference on Computational Linguistics (COLING 2010)*, Beijing, pp. 1550–1557.

[P13] **Cheung, J. C.-K.** and G. Penn (2010) Entity-based Local Coherence Modelling using Topological Fields. *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics (ACL 2010),* Uppsala, pp. 186–195. [NSERC]

[P14] **Corlett, E.** and G. Penn (2010) An Exact A* Method for Deciphering Letter-Substitution Ciphers. *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics (ACL 2010),* Uppsala, pp. 1040–1047. [ERA]

[P15] **Fowler, T. A. D.** and G. Penn (2010) Accurate Context-Free Parsing with Combinatory Categorial Grammar. *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics (ACL 2010),* Uppsala, pp. 335–344. [NSERC]

[P16] **Skala, M., V. Krakovna,** J. Kramár and G. Penn (2010) A Generalized-Zero-Preserving Method for Compact Encoding of Concept Lattices. *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics (ACL 2010),* Uppsala, pp. 1512–1521. [NSERC]

[P17] **Collins, C.,** G. Penn and S. Carpendale (2009) Bubble Sets: Revealing Set Relations over Existing Visualizations. *IEEE Conference on Information Visualization (InfoVis-09)*, Atlantic City. 8 pages. [NECTAR]

[P18] **Cheung, J. C.-K.** and G. Penn (2009) Topological Field Parsing of German. *Proceedings of the 47th Annual Meeting of the Association for Computational Linguistics (ACL 2009),* Singapore, pp. 64–72. [NSERC]

[P19] **Zhu, X.,** G. Penn and **F. Rudzicz** (2009) Summarizing Multiple Spoken Documents: Finding Evidence from Untranscribed Audio. *Proceedings of The 47th Annual Meeting of the Association for Computational Linguistics (ACL 2009),* Singapore. pp. 549–557. [NECTAR]

[P20] **Munteanu, C.,** G. Penn and **X. Zhu** (2009) Improving Automatic Speech Recognition for Lectures through Transformation-based Rules Learned from Minimal Data. *Proceedings of the 47th Annual Meeting of the Association for Computational Linguistics (ACL 2009),* Singapore. pp. 764–772. [NECTAR]

[P21] **Kazemian, S., F. Rudzicz,** G. Penn and **C. Munteanu** (2008) A Critical Assessment of Spoken Utterance Retrieval through Approximate Lattice Representations. *Proceedings of the 10th ACM International Conference on Multimedia Information Retrieval (MIR-08),* Vancouver, pp. 83–88. [NECTAR]

[P22] Penn, G. and **X. Zhu** (2008) A Critical Reassessment of Evaluation Baselines for Speech Summarization. *Proceedings of the 46th Annual Meeting of the Association for Computational Linguistics (ACL 2008)*, Columbus, pp. 470–478. [NECTAR]

[P23] **Munteanu, C.,** R. Baecker, and G. Penn (2008) Collaborative Editing for Improved Usefulness and Usability of Transcript-Enhanced Webcasts. *Proceedings of the 2008 ACM Conference on Human Factors in Computing Systems (CHI 2008)*, Florence, pp. 373–382. [NECTAR]

[P24] **Wigdor, D.,** G. Penn, K. Ryall, A. Esenther and C. Shen (2007) Living with a Tabletop: Analysis and Observations of Long Term Office Use of a Multi-Touch Table. *Proceedings of the Second IEEE International Workshop on Horizontal Interactive Human-Computer Systems (TABLETOP 2007)*. Newport, Rhode Island, pp. 60–67.

2.3 Edited Books and Journal Special Issues

[P25] Penn, G. (2011) Special Issue on the Mathematics of Language. *Journal of Logic, Language and Information* **20**(3), pp. 273–417.

[P26] Penn, G. (2008) *Formal Grammar: Proceedings of the Vienna Conference*. G. Penn, ed. CSLI Publications. viii + 169 pp.

2.4 Non-refereed Book Chapters

[P27] Penn, G. (2012) Computational Linguistics. *Handbook of the Philosophy of Science*, D. M. Gabbay, P. Thagard, J. Woods, R. Kempson, T. Fernando and N. Asher eds., vol. 14 (Philosophy of Linguistics), pp. 143–173.

2.5 Publications from Supervised Research

[P28] Hinton, G., L. Deng, D. Yu, G. Dahl, **A.-R. Mohamed,** N. Jaitly, A. Senior, V. Vanhoucke, P. Nguyen, T. Sainath and B. Kingsbury (2012) Deep Neural Networks for Acoustic Modeling in Speech Recognition *IEEE Signal Processing Magazine* **29**(6), pp. 82–97. [GRAND]

[P29] **Mohamed, A.-R.,** G. E. Dahl, and G. Hinton (2012) Acoustic Modeling using Deep Belief Networks. *IEEE Transactions on Audio, Speech, and Language Processing*, **20**(1), pp. 14–22. [GRAND]

[P30] **Rudzicz, F.** (2012) Using Articulatory Likelihoods in the Recognition of Dysarthric Speech. *Speech Communication*, **54**(3), pp. 430-444.

[P31] **Rudzicz, F.,** G. Hirst, and P. Van Lieshout (2012) Vocal Tract Representation in the Recognition of Cerebral Palsied Speech. *Journal of Speech, Language, and Hearing Research,* **55**(4), pp. 1190–1207.

[P32] **Rudzicz, F.,** A.K. Namasivayam, and T. Wolff (2012) The TORGO Database of Acoustic and Articulatory Speech from Speakers with Dysarthria. *Language Resources and Evaluation*, **46**(4), pp. 523–541.

[P33] **Rudzicz, F.** (2011) Articulatory Knowledge in the Recognition of Dysarthric Speech. *IEEE Transactions on Audio, Speech and Language Processing*, **19**(4), pp. 947–960. [CRD]

[P34] **Fowler, T.** (2008) Efficient Parsing with the Product-Free Lambek Calculus *Proceedings of the 22nd International Conference on Computational Linguistics (COLING-08),* pp. 217-224. [NSERC]

2.6 Industrially Relevant R&D Activities

Spoken Dialogue Systems for Military Simulation and Training Environments, 2009–2012: I have worked extensively with the Defence R & D Canada and CAE Professional Services, Inc. to design speech recognition systems for training military personnel.

2.7 Patents and Copyrights

Rudzicz, F., G. Hirst, G. Penn and F. Shein (2011) Automated System for Transforming and Increasing the Intelligibility of Disabled Speech. U.S. Patent 61/511,275 (PCT). [GRAND]

3 Other Evidence of Impact and Contributions

3.1 Awards

Best Paper Award: **Mengistu, K.,** R. Compton, and G. Penn (2012) Towards Concept-Based English-Inuktitut Automatic Speech-to-speech Machine Translation. *3rd Annual Conference on Graphics, Animation and New Media (GRAND 2012)*.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto, 2012.

IEEE, Senior Member, promoted 2010.

3.2 Prestigious Invited Lectures

Penn, G. (2010) The Quantitative Study of Writing Systems. Traitement Automatique des Langues Naturelles (TALN 2010), Montréal.

Penn, G. (2009) Evaluating Speech Summarization. National Science Foundation, Arlington, Virginia.

Penn, G. (2009) TRALE for Grammar Design. 16th International Conference on Head-driven Phrase Structure Grammar, Goettingen.

Penn, G. (2009) HPSG Design and Meet Semi-latticehood. Workshop on Grammar Theory and Grammar Implementation, Free University of Berlin.

Penn, G. (2008) Summarizing Speech. *IEEE Workshop on Spoken Language Technology (SLT-08)*, Goa.

Penn, G. (2008) Alignment and Parameter Estimation for Archaeological Decipherment. *22nd International Conference on Language and Knowledge Processing*, Pusan National University, Busan, Korea.

3.3 Research Fellowships

Project Leader, *Complementary Evaluation Measures for Speech Transcription*, Center for Language and Speech Processing Summer Workshop, Johns Hopkins University, 2012.

Visiting Researcher, Human Systems Integration Division, NASA Ames Research Center, 2011.

Visiting Researcher, Center for the Study of Language and Information, Stanford University, 2011.

Visiting Associate Professor, Departments of Computer Science and Linguistics, Stanford University, 2011.

Visiting Scholar, Information Sciences Institute, University of Southern California, 2007.

3.4 Editorial Boards

Editorial Board, *Linguistics & Philosophy*, 2004–present.

Editorial Board, *Research on Language and Computation*, 2002–2010.

3.5 Committee Memberships (Abridged)

Working Group Leader, International Standards Organization, Terminology, Language and Content Resource Standardization Technical Committee, Language Resource Management Subcommittee, Feature System Declaration Working Group (ISO/TC 37/SC 4/WG 1), 2007–present.

President, Mathematics of Language Society, 2005–2007.

Organizer, *7th Workshop on Speech in Mobile and Pervasive Environments (SIMPE-12), 14th International Conference on Human-Computer Interaction with Mobile Devices and Services (Mobile HCI 2012),* San Francisco.

Organizer, *Joint Workshop on Visualization of Linguistic Patterns and Uncovering Language History from Multilingual Resources, 13th Conference of the European Chapter of the Association for Computational Linguistics (EACL-12),* Avignon, France.

Programme Committee Co-chair, *11th Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL HLT 2010)*, Los Angeles.

Organizer, *Workshop on Parsing with Categorial Grammar, 21st European Summer School in Logic, Language and Information (ESSLLI 2009)*, Bordeaux.

Co-organizer, *Workshop on Parsing German, 46th Annual Meeting of the Association for Computational Linguistics (ACL 2008)*, Columbus.

Standing Committee, *Conference on Formal Grammar*, 2002 – 2009.

Programme Committee Member, *Annual Meeting of the Canadian Conference on Artificial Intelligence (AI)*, 2005–2013.

Panelist, Division of Information and Intelligent Systems (IIS), *National Science Foundation (NSF)*, 2008.

3.6 External Teaching and Consulting Activities

Speech-based Interaction for Serious Games and Virtual Training Simulators (tutorial with **C. Munteanu**), *Interservice/Industry Training, Simulation and Education Conference (I/ITSEC)*. Orlando, 2010–2012.

Speech-Based Interaction: The Myths, Challenges, and Opportunities (tutorial with **C. Munteanu**), *International Conference on Human-Computer Interaction with Mobile Devices and Services (Mobile HCI)*, 2010–2012.

Hands-free Interfaces: The Myths, Challenges, and Opportunities of Speech-based Interaction (tutorial with **C. Munteanu**), *Conference on Human Factors in Computing Systems (CHI)*, 2011–2012.

Scope and Negation: Typological Diversity meets Computational Semantics (four-week advanced graduate course with F. Richter), *Linguistics Society of America Summer Institute*, University of Colorado at Boulder, 2011.

Linguistic Information Visualization (one-week course with S. Carpendale), *21st European Summer School in Logic, Language and Information (ESSLLI 09)*. Bordeaux, 2009.

Interactive Visualization for Computational Linguistics (tutorial with **C. Collins** and S. Carpendale), *46th Annual Meeting of the Association for Computational Linguistics (ACL 2008)*, Columbus, 2008.

3.7 Public Awareness/Education

Interview, ”Babel: The Gap”, CBC Radio One Toronto, 11:30 EDT, 16 Jul 2012.

Interview, “Twitter lashes out at Google search changes,” *Toronto Star*, 11 January 2012.

Vice President, Sigma Xi, University of Toronto Chapter, 2004–2006, 2009–2011.

President, Sigma Xi, University of Toronto Chapter, 2007–2009.

Judge and Award Presenter. Toronto Sci-Tech Fair, 2009.

Interview, ”Up To Speed with Margaux Watt”, CBC Radio One Manitoba, 3:30 CST, 22 Feb 2008.

4 Contributions to the Training of Highly Qualified Personnel

My HQP have taken summer internships at Facebook (1), Google (1), IBM (2) and Microsoft (3).

Two of my four Ph.Ds have gone on to academic professorships (University of Ontario Institute of Technology and Iowa State University).

Seven of my HQP are now employed in industrial research labs (Google New York (2), Groupon, NRC Fredericton, NRC Ottawa and Nuance Communications (2)).

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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: 2013/04/09

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Penn	Gerald	GB	Valid 242985

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

10 King's College Rd., SF 3302
University of Toronto
Toronto ON M5S3G4
CANADA

If address is temporary, indicate:

Starting date

Leaving date

Telephone number	Facsimile number	E-mail address
1 (416) 9787390	(416) 9781455	gpenn@cs.utoronto.ca

Telephone number (alternate)

Give an alternate telephone number only if you can be reached at that number during business hours.

Gender (completion optional): [X] Male [ ] Female

LANGUAGE CAPABILITY

English	Read [X]	Write [X]	Speak [X]
French	Read [X]	Write [ ]	Speak [ ]

I wish to receive my correspondence: in English [X] in French [ ]

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).

computational linguistics, natural language processing, acoustic modelling, spoken language processing, speech recognition and synthesis, typed feature logic, attribute-value logic, digital signal processing, substructural logic, logic programming

Research subject code(s)

Primary: 2801

Secondary: 2514

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FORM 100
Personal Data Form
PART I

Date: 2013/06/15

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Gutwin	Carl	CA	103129

☐ 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

Department: Computer Science

Campus:

Canadian postsecondary institution:

Tenured or tenure-track academic appointment: Yes ☐ No ☐

Part-time appointment ☐ Full-time appointment X

- For all non-tenured or non tenure-track academic appointment and Emeritus Professors, complete Appendices B & C
- For life-time Emeritus Professor and part-time positions, complete Appendix C

ACADEMIC BACKGROUND

Degree	Name of discipline	Institution	Country	Date yyyy/mm
Bachelor's	Computer Science	Saskatchewan	CANADA	1988 / 05
Master's	Computer Science	Saskatchewan	CANADA	1991 / 06
Doctorate	Computer Science	Calgary	CANADA	1997 / 12

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)		
	Supervised	Co-supervised	Supervised	Co-supervised	Total
Undergraduate	2		6		8
Master's	4	1	6	6	17
Doctoral	3		4	3	10
Postdoctoral			2		2
Others	1		5		6
Total	10	1	23	9	43

Personal information collected on this form and appendices will be stored in the Personal Information Bank for the appropriate program.

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Version française disponible

Not Completed

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	Saskatchewan	Computer Science	1997/07
Associate Professor	University of Saskatchewan	Computer Science	2000/07 to 2006/06
Post-doctoral fellow	University of Waikato, New Zealand	Computer Science Department	1998/01 to 1998/07
Assistant Professor	University of Saskatchewan	Computer Science	1997/07 to 2000/06
Researcher	Alberta Research Council	Advanced Computing and Engineering	1991/05 to 1994/01

Personal identification no. (PIN)	Family name
103129	Gutwin

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

Gutwin, CA	Next-Generation Groupware	100,000	2006
	Canada Research Chairs	100,000	2007
	Canada Research Chair Tier II	100,000	2008
	40 hours/month	100,000	2009
		100,000	2010
Gutwin, CA	Software Infrastructures for Interactive	34,000	2007
	Groupware	34,000	2008
	NSERC	34,000	2009
	Discovery Grants	34,000	2010
	40 hours/month	34,000	2011
Graham, N., and 2 others	Technology for Rich Group Interaction in	159,100 (30%)	2009
	Networked Games	163,075 (30%)	2010
	NSERC	160,050 (30%)	2011
	Strategic Project Grants		
	40 hours/month		

b) Support currently held

Maurer, F., and 9 others	SurfNet: A network for surface research	1,000,000 (7%)	2010
	NSERC	1,000,000 (7%)	2011
	Research Networks Grants	1,000,000 (7%)	2012
	40 hours/month	1,000,000 (7%)	2013
		1,000,000 (7%)	2014

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Personal identification no. (PIN)	Family name
103129	Gutwin

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

Booth, K., and 29 others	GRAND NCE	5,000,000 (1%)	2010
	NSERC	5,000,000 (1%)	2011
	Networks of Centres of Excellence	5,000,000 (1%)	2012
	40 hours/month	5,000,000 (1%)	2013
		5,000,000 (1%)	2014
Gutwin, Carl A	Improving Quality of Interaction in Distributed	52,000	2012
	Real-Time Groupware	52,000	2013
	NSERC	52,000	2014
	Discovery Grants	52,000	2015
	15 hours/month	52,000	2016

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Canada

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
103129	Gutwin

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Katherine Schramm	Master's (In Progress)	Supervised 2013 -	Supporting novice-to-expert transitions in interfaces	MSc Student, University of Saskatchewan
Mike Sheinin	Master's (In Progress)	Supervised 2013 -	Modeling fatigue as a game design principle	MSc Student, University of Saskatchewan
Scott Olsen	Undergraduate (In Progress)	Supervised 2013 -	Hotkeys for tablet interfaces	B.Sc. student, University of Saskatchewan
Weston Carlson	Undergraduate (In Progress)	Supervised 2013 -	Attention-based disconnection support	B.Sc. student, University of Saskatchewan
Jared Cechanowicz	Res. Associate (In Progress)	Supervised 2012 -	Gamification of market research tools	Research Associate, University of Saskatchewan
Doucette, Andre	Doctoral (In Progress)	Co-supervised 2010 -	Supporting low-level interactions on digital tabletops	Ph.D. student, University of Saskatchewan
John Yobb	Master's (In Progress)	Supervised 2010 -	Groupware performance for the WWW	M.Sc. student and software developer, Univ. of Saskatchewan
Tavassolian, Amin	Master's (In Progress)	Co-supervised 2010 -	Adaptive minigames for balancing multi-user games	M.Sc. student, University of Saskatchewan
Craig Yellowlees	Master's (In Progress)	Supervised 2009 -	Coordination elements in electronic sports games	M.Sc. student, University of Saskatchewan
McEwan, Gregor	Doctoral (In Progress)	Supervised 2009 -	Community-based groupware	Ph.D. Student, University of Saskatchewan
Reetz, Adrian	Doctoral (In Progress)	Supervised 2008 -	Storing digital objects in real-world locations	Ph.D. student, University of Saskatchewan
Wong, Nelson	Doctoral (In Progress)	Supervised 2006 -	Natural pointing in collaborative virtual environments	Ph.D. student, University of Saskatchewan
Roy, Banani	Doctoral (Completed)	Co-supervised 2010 - 2013	Disconnection-aware groupware applications	Software developer, VendAsta Inc., Saskatoon
Zohoorian, Aryan	Master's (Completed)	Co-supervised 2010 - 2013	A framework of coordination in multi-player games	Software Developer, Calgary
Flatla, David	Doctoral (Completed)	Supervised 2009 - 2013	Situation-Specific Models of Colour Perception	Lecturer, Dundee University, Scotland
Genest, Aaron	Doctoral (Completed)	Supervised 2008 - 2013	Gesturing over distributed tabletop displays	Software manager, Solido Design, Saskatoon
Brooks, Christopher	Doctoral (Completed)	Co-supervised 2007 - 2013	Video archiving for on-line learning communities	Post-doctoral fellow, University of Michigan
Pavlovych, Andriy	Postdoctoral (Completed)	Co-supervised 2011 - 2012	Infrastructure for surface applications	Post-doctoral fellow, York University
Bateman, Scott	Doctoral (Completed)	Co-supervised 2008 - 2012	Web-based interaction histories	Assistant Professor, University of Prince Edward Island
Eremondi, Joseph	Undergraduate (Completed)	Supervised 2011 - 2011	Full-coverage low-resolution displays	B.Sc. student, University of Saskatchewan

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
103129	Gutwin

Name	Type of HQP Training and Status	Years Supervised or Co-supervised	Title of Project or Thesis	Present Position
Gowen, Justin	Undergraduate (Completed)	Supervised 2011 - 2011	Web technology for collaboration over maps	B.Sc. student, University of Saskatchewan
Sheinin, Michael	Undergraduate (Completed)	Supervised 2011 - 2011	Whole-body interaction with large surfaces	B.Sc. student, University of Saskatchewan
Stephen Damm	Res. Associate (Completed)	Supervised 2010 - 2011	Surface software components	Software Developer, Saskatoon
Yudi Xue	Master's (Completed)	Co-supervised 2009 - 2011	Collaboration in modelling and simulation systems	Software developer, VendAsta Inc., Saskatoon
Xiao, Robert	Undergraduate (Completed)	Supervised 2009 - 2010	Projection cursors for displayless space in MDEs	Ph.D. student, Carnegie Mellon University, USA
Doucette, Andre	Master's (Completed)	Co-supervised 2008 - 2010	Integrating display and input space	Ph.D. student, University of Saskatchewan
Lippold, Michael	Master's (Completed)	Co-supervised 2008 - 2010	Software support for experience sampling	Software developer, VendAsta Inc., Saskatoon
Knowles, Dylan	Undergraduate (Completed)	Supervised 2008 - 2009	Infrastructure for real-time networked games	B.Sc. student, University of Saskatchewan
Schneider, Oliver	Undergraduate (Completed)	Supervised 2008 - 2009	Audio awareness for real-time groupware	M.Sc. student, University of British Columbia
Barjawi, Mutasem	Master's (Completed)	Supervised 2007 - 2009	Coordination in real-time groupware	Software developer, TinyEye Inc., Saskatoon
Dielschneider, Shane	Master's (Completed)	Co-supervised 2007 - 2009	Procedural visual effects for groupware avatars	Software developer, University of Saskatchewan
Nacenta, Miguel	Doctoral (Completed)	Supervised 2004 - 2009	Cross-display movement in multi-display environments	Lecturer, St. Andrews University, Scotland
de Alwis, Brian	Postdoctoral (Completed)	Co-supervised 2007 - 2008	Architectures for groupware toolkits	Director, Manumitting Technologies, Kitchener
Flatla, David	Master's (Completed)	Supervised 2006 - 2008	Adapting visualizations for colour-blind users	Ph.D. student, University of Saskatchewan
Kattinakere, Ragu	Master's (Completed)	Supervised 2006 - 2008	Modeling interaction above the surface	Software developer, IBM Inc., Toronto
Stuckel, Dane	Master's (Completed)	Supervised 2005 - 2008	The effects of local lag on distributed groupware	Software consultant, Moncton
Ouelette, Colin	Res. Associate (Completed)	Supervised 2006 - 2007	Interaction techniques for tabletop groupware	LLB student, University of Alberta
Watson, Mark	Res. Associate (Completed)	Supervised 2006 - 2007	An open privacy protocol for instant messengers	Interaction designer, InVivo Communications, Toronto
Kim, James	Master's (Completed)	Co-supervised 2004 - 2007	Mediating privacy and awarenesss in a video window	Software developer, Intergraph Inc., Edmonton
Blum, Roger	Master's (Completed)	Supervised 2003 - 2007	Information overload in community-based groupware	Software developer, SED Systems, Saskatoon

1. Most Significant Contributions to Research in the Past Six Years

Groupware awareness. With colleagues and HQP, I developed the idea that awareness of others is an important factor in the design of distributed groupware, and have investigated the idea in numerous systems [8,59,70,73,76], frameworks [11,37,38], case studies [15,72,77], and experiments [32,45,66]. This work has had a substantial impact on the CSCW research community: my publications are consistently cited (Google shows more than 1000 citations of my papers in this area), and I am internationally known as one of the main experts in group awareness.

Application-level networking. I and my students have carried out early and influential research in techniques to improve network performance in real-time distributed groupware. We developed and studied techniques for dealing with network delay [51,63], technologies for web-based networking [44], toolkits for high-performance groupware [57], techniques for improving Quality of Service [74], architectures for dealing with disconnection episodes [33,50], and techniques for compressing groupware messages [25]. This work has attracted attention from both the academic and industrial sides of the CSCW community (e.g., I have been invited to speak to the Google Docs group, Nov. 2011).

Evaluation of groupware. My team and I pioneered new methods for conducting low-cost evaluations of groupware systems - long considered a difficult problem because of the expense and time needed for in-situ observational studies. We devised new evaluation techniques based on the idea of analyzing the 'mechanical' activities of collaboration, including usability analysis frameworks [12,13] and walkthrough and inspection techniques using heuristic-evaluation methods [53]. This work is seen as an important new direction in CSCW, and our publications in this area are widely cited.

Visual interaction techniques. We have developed and evaluated a large number of novel techniques for improving interactions in visual workspaces, both for groups and for individuals. This work includes techniques for targeting and selection [1,9,40,43,64,67,78], manipulating objects on tables and multi-display environments [61,62,80,2], window switching [39,56], steering [41], collaborative pointing [48], and navigating [55,65,71,75,4,20] in small and large display contexts. These techniques have appeared in top-tier venues and are cited widely by other HCI researchers.

Modeling human performance. With colleagues and students, I have developed new models of human perception [1,36,46] and performance with user interfaces [3,6,10,42,49,79]. The performance models allow designers to evaluate new UI arrangements without requiring empirical studies, which increases the ability to explore and test new designs. The perceptual models improve accessibility for users with situational or genetic colour vision deficiencies. This work has revealed new understanding of new and existing interface paradigms, and is generating a great deal of interest from colleagues.

2. Selected Research Contributions from the Past Six Years

Articles in refereed journals (HQP listed in bold)

1. **Flatla, D**., and Gutwin, C., Situation-Specific Models of Color Differentiation, *ACM Transactions on Accessible Computing*, ACM Press, 2013, in press.
2. **Bateman, S.**, Mandryk, R., Gutwin, C., and **Xiao, R.**, Analysis and Comparison of Target Assistance Techniques for Relative Ray-Cast Pointing, *IJHCS*, 2013, in press.
3. Cockburn, A., Ahlstroem, D., and Gutwin, C. Understanding Performance in Touch Selections: Tap, Drag and Radial Pointing Drag with Finger, Stylus and Mouse, *IJHCS*, vol. 70, no. 3, 2012, 218-233.
4. Thomas, N., Schneider, O., Gutwin, C., and Elias, L., Dorsal Stream Contributions to Perceptual Asymmetries. *Journal of the International Neuropsychology Society*, 18, 2, 251-259.
5. Cockburn, A., Quinn, P., Gutwin, C., Ramos, G., and Looser, J., Air pointing: Design and evaluation of spatial target acquisition with and without visual feedback, *IJHCS*, 69, 6, 2011, 401-414.
6. Cockburn, A. and Gutwin, C., A Model of Novice and Expert Navigation Performance in Constrained-Input Interfaces. *ACM Trans. on CHI*, 17, 3, 2010, 1-38.
7. Thomas, N., **Stuckel, D.**, Gutwin, C., and Elias, L., Directional Collisions During a Route-Following Task, *J. International Neuropsychological Society*, 15, 2, 2009, 225-30.

8. Tee, K., Greenberg, S. and Gutwin, C., Artifact Awareness through Screen Sharing for Distributed Groups, *Human-Computer Studies*, 67, 9, 2009, 677-702.
9. **Nacenta, M.**, Gutwin, C., Aliakseyeu, D., and Subramanian, S., There and Back Again: Cross-Display Object Movement in Multi-Display Environments, *HCI*, 24,1, 2009, 170 - 229.
10. Cockburn, A., and Gutwin, C., A Predictive Model of Human Performance with Scrolling and Hierarchical Lists, *HCI*, 24, 3, 2009, 273-314.
11. Gutwin, C., Greenberg, S., **Blum, R.**, **Dyck, J.**, and Tee, K., Supporting Informal Collaboration in Shared-Workspace Groupware, *Journal of Universal Computer Science*, 14, 9, 2008, 1411-1434.
12. **Pinelle, D.**, and Gutwin, C., Evaluating Teamwork Support in Tabletop Groupware Applications Using Collaboration Usability Analysis, *Personal and Ubiquitous Computing*, 12, 3, 2008, 237-254.
13. **Pinelle, D.**, and Gutwin, C., Loose Coupling and Healthcare Organizations: Deployment Strategies for Groupware, *Computer-Supported Cooperative Work*, 15, 5-6, 2006, 537-572.
14. Sykes Tottenham, L., Saucier, D., Elias L., and Gutwin, C., Men are More Accurate in Aiming at Targets in Both Near Space and Extrapersonal Space, *Perceptual & Motor Skills*, 101, 1, 2005, 3-12.

Full papers in fully-refereed conference proceedings (HQP listed in bold)

15. **Flatla, D.**, Reinecke, K., Gutwin, C., and Gajos, K., SPRWeb: Preserving Subjective Responses to Website Colour Schemes through Automatic Recolouring, *Proc. CHI 2013*, 2069-2078.
16. **Doucette, A.**, Mandryk, R., Gutwin, C., Nacenta, M., and Pavlovych, A., The Effects of Tactile Feedback and Movement Alteration on Interaction and Awareness with Digital Embodiments, *Proc. CHI 2013*, 1891-1900.
17. **Sutcliffe, S.**, **Ivkovic, Z.**, **Flatla, D.**, **Pavlovych, A.**, Stavness, I., and Gutwin, C., Improving Digital Object Handoff Using the Space Above the Table, , *Proc. CHI 2013*, 735-744.
18. Malacria, S., Bailly, G., Harrison, J., Cockburn, A., and Gutwin, C., Promoting Hotkey Use through Rehearsal with ExposeHK, , *Proc. CHI 2013*, 573-582.
19. Scarr, J., Cockburn, A., Gutwin, C., and Malacria, S., Testing the Robustness and Performance of Spatially Consistent Interfaces, *Proc. CHI 2013*, 3139-3148.
20. Fitchett, S., Cockburn, A., and Gutwin, C., Improving Navigation-Based File Retrieval, *Proc. CHI 2013*, 2329-2338.
21. **Doucette, A.**, Gutwin, C., Mandryk, R., and Nacenta, M., Sometimes When We Touch: How Arm Embodiments Change Reaching and Collaboration on Digital Tables, *Proc. CSCW 2013*, 193-202.
22. **Bateman, S.**, Gutwin, C., and McCalla, G., Social Navigation for Loosely-Coupled Information Seeking in Tightly-Knit Groups using WebWear, *Proc. CSCW 2013*, 955-966.
23. **Genest, A.**, Gutwin, C, Tang, A., **Kalyn, M.**, and **Ivkovic, Z.**, KinectArms: a Toolkit for Capturing and Displaying Arm Embodiments in Distributed Tabletop Groupware, *Proc. CSCW 2013*, 157-166.
24. Quinn, P., Cockburn, A., Casiez, G., Roussel, N., and Gutwin, C., Exposing and Understanding Scrolling Transfer Functions, *Proc. UIST 2012*, 341-350.
25. **Dyck, J.**, Gutwin, C., and Makaroff, D., Adaptive Forward Error Correction for Real-Time Groupware, *Proc. Group 2012*, 121-130.
26. **Wong, N.**, and Gutwin, C. (2012) Controlling an Avatar's Pointing Gestures in Desktop Collaborative Virtual Environments. *Proc. Group 2012*, 21-30.
27. **Flatla, D.**, and Gutwin, C. (2012) "So That's What You See!" Building Understanding with Personalized Simulations of Color Vision Deficiency, *Proc. ASSETS 2012*, 22 - 24.
28. Scarr, J., Cockburn, A., Gutwin, C., and Bunt, A. (2012) Improving Command Selection with CommandMaps, *Proc. CHI 2012*, 257-266. (Best paper award: top 1% of submissions).
29. **Flatla, D.**, and Gutwin, C. (2012) SSMRecolor: Improving Recoloring Tools with Situation-Specific Models of Color Differentiation, *Proc. CHI 2012*, 2297-2306.
30. Cockburn, A., Quinn, P., Gutwin, C., and Fitchett, S. (2012) Improving Scrolling Devices with Document-Length-Dependent Gain, *Proc. CHI 2012*, 267-276.
31. **MacEwan, G.**, Gutwin, C., Nacke, L., and Mandryk, R., "I'm Just Here to Play Games:" Social

Dynamics and Sociability in an Online Game Site, *Proc. CSCW 2012*, 549-558.

32. **Genest, A.**, and Gutwin, C., Evaluating the Effectiveness of Height Visualizations for Improving Gestural Communication at Distributed Tables, *Proc. CSCW 2012*, 519-528.
33. **Roy, B.**, Gutwin, C., and Graham, T.C.N., DiscoTech: A Plug-In Toolkit to Improve Handling of Disconnection and Reconnection in Real-Time Groupware, *Proc. CSCW 2012*, 1287-1296.
34. **Tavassolian, A.**, Stanley, K., Gutwin, C., and **Zohoorian, A.**, Time Balancing with Adaptive Time-Variant Minigames, *Proc. IFIP ICEC*, 59-70. (Honourable mention for best paper)
35. **Flatla, D.**, Gutwin, C., Nacke, L., **Bateman, S.**, Mandryk, R., Calibration Games: Making Calibration Tasks Enjoyable by Adding Motivating Game Elements, *Proc. UIST 2011*, 403-412.
36. **Flatla, D.**, and Gutwin, C., Improving Calibration Time and Accuracy for Situation-Specific Models of Color Differentiation, *Proc. ASSETS 2011*, 195-202. (Best Paper Award)
37. **Genest, A.**, and Gutwin, C., Characterizing Deixis over Surfaces to Improve Remote Embodiments, *Proc. European Conference on Computer-Supported Cooperative Work (ECSCW 2011)*, 253-272.
38. Birhnoltz, J., Schultz, J., Lepage, M., Gutwin, C., A Framework for Supporting Joint Interpersonal Attention in Distributed Groups, *Proc. IFIP Conference on HCI (Interact 2011)*, 295-312.
39. Tak, S., Scarr, J., Gutwin, C., and Cockburn, A., Supporting Window Switching with Spatially Consistent Thumbnail Zones: Design and Evaluation, *Proc. Interact 2011*, 331-347.
40. **Xiao, R.**, **Nacenta, M.**, Mandryk, R., Cockburn, A., Gutwin, C., Ubiquitous Cursor: A Comparison of Direct and Indirect Pointing Feedback in Multi-Display Environments. *Proc. of Graphics Interface (GI 2011)*, 135-142. (Best student paper award)
41. **Bateman, S.**, **Doucette, A.**, **Xiao, R.**, Gutwin, C., Mandryk, R., Cockburn, A., Effects of View, Input Device, and Track Width on Video Game Driving, *Proc. GI 2011*, 207-214.
42. Scarr, J., Cockburn, A., Gutwin, C., and Quinn, P., Dips and Ceilings: Understanding and Supporting Transitions to Expertise in User Interfaces, *Proc. ACM Conference on Human Factors in Computing Systems (CHI 2011)*, 2741-2750.
43. **Bateman, S.**, Mandryk, R., Gutwin, C., Cockburn, A., and Stach, T., Target assistance for subtly balancing competitive play, *CHI 2011*, 2355-2364. (Honourable mention for best paper)
44. Gutwin, C., **Lippold, M.**, and Graham, N., Real-Time Groupware in the Browser: Testing the Performance of Web-Based Networking, *Proc. CSCW 2011*, 167-176.
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Book chapters (peer reviewed)

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3. Other Evidence of Impact and Contributions

- 2011: H-index 32 and 2435 citations (47th worldwide in HCI), at academic.research.microsoft.com
- 2011: Excellence in Graduate Supervision Award, Department of Computer Science, U of S
- 2011: Keynote speaker, Graphics Interface 2011 conference
- 2010: Papers track co-chair, ACM CHI 2011 (1506 submissions, 144 committee members)
- 2009: Conference co-chair, ACM CSCW 2010 (more than 400 attendees)
- 2009: Faculty Research Fellowship, Microsoft Research (April – June 2009)
- 2007: Papers track co-chair, ECSCW 2007 (125 submissions, 38 committee members)
- 2007: Erskine Fellowship, University of Canterbury (Christchurch, NZ)
- 2006: Papers track co-chair, Graphics Interface 2006 (74 submissions, 19 committee members)
- 2006: Canada Research Chair, Tier II (renewal)
- 2006-2011: three best paper awards and five honourable-mention awards
- 2006-2011: Consultant to Canadian software companies (e.g., ADA Ottawa; Vecima Networks)
- 2006-2011: Editorial board, JCSCW; Conference committees including CHI (5), CSCW (3), UIST (1), ECSCW (2), Group (3); Numerous reviews for JHCI, JHCS, JCSCW, ToCHI; Reviews for NSERC Discovery and RTI, and British EP-SRC proposals; four tenure and promotion cases.

5. Contributions to the Training of HQP

I maintain a large, successful, and diverse training program that is oriented towards developing all aspects of an HQP's research abilities. I use a research process that includes understanding of the human factors underlying HCI questions, invention of technological solutions to real-world problems, assessment of solutions through appropriate evaluation methodologies, development of reusable components and toolkits to disseminate the research ideas, and reflection on the process of research itself. Training in each of these elements provides valuable knowledge and skills for HQP as they move towards research or industry careers.

In the past six years, I have supervised to completion seven PhD and eight MSc students. I have also supervised the training of more than forty other HQP including post-docs, research assistants, summer undergraduates, and honours students. My goal is for HQP to become experts in the research process and gain first-hand knowledge of the larger research enterprise, by tackling real-world problems, by publishing regularly, and by participating in conferences. I have created an interdisciplinary environment with lab members and visitors from computer science, design, psychology, art history, sociology, and engineering: these diverse perspectives provide a broad base of knowledge and expertise, and help trainees see the wider picture of HCI and computer science. I meet my students frequently and work with them as apprentices in all aspects of our research; my training efforts were recognized in 2011 with the Excellence in Graduate Supervision award from the Department of Computer Science.

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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: 2013/06/15

Family name	Given name	Initial(s) of all given names	Personal identification no. (PIN)
Gutwin	Carl	CA	103129

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 Computer Science
110 Science Place
Saskatoon SK S7N5C9

If address is temporary, indicate:

Starting date

Leaving date

Telephone number	Facsimile number	E-mail address
1 (306) 9668646	(306) 9664884	gutwin@cs.usask.ca

Telephone number (alternate)

Give an alternate telephone number only if you can be reached at that number during business hours.

Gender (completion optional): [X] Male [ ] Female

LANGUAGE CAPABILITY

English	Read [X]	Write [X]	Speak [X]
French	Read [ ]	Write [ ]	Speak [ ]

I wish to receive my correspondence: in English [X] in French [ ]

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).

Human-computer interaction, Computer-supported cooperative work, Usability engineering, Distributed groupware, Groupware usability, Workspace awareness, Information visualization, Interactive systems design

Research subject code(s)

Primary: 2721

Secondary: 2710

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 Gutwin, Carl CA

Department	Postsecondary Institution
Computer Science	Saskatchewan

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 *Privacy Act*, 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.