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Professional Preparation

Ph.D., 2005	University of Waterloo, Canada	Computer Science
M. Math, 2000	University of Waterloo, Canada	Computer Science
B.Sc., 1997	University of Guelph, Canada	Major: Physics Minor: Computing & Info. Science

Appointments

Sept. 2007 –	Assistant Professor (tenure track) – Dept. Computer Science University of Rochester, Rochester, NY, USA
Jan 2005 – Aug. 2007	Research Scientist – Dept. Computer Science University of Massachusetts, Amherst, MA, USA
July 2004 – Oct 2004	Research Intern, Machine Learning and Applied Statistics, Microsoft Research Redmond, WA, USA
Jan. 2004 – March 2004	Research Intern, Computer Vision, Microsoft Research Redmond, WA, USA
May 2003 – Sept. 2003	Research Intern, Computer Vision, Microsoft Research Redmond, WA, USA
Sept. 2001 – May 2003	Research Assistant, Probabilistic and Statistical Inference Group Dept. Electrical and Computer Engineering University of Toronto, ON, Canada
Sept. 1997 – Sept. 2001	Research Assistant School of Computer Science University of Waterloo, ON, Canada
Sept. 1997 – Dec. 2003	Teaching Assistant School of Computer Science, University of Waterloo Courses: Computational Vision, Introduction to Artificial Intelligence, Concurrent Programming, Intro. To Programming, Operating Systems, Scientific Computation.

April 1997 – August 1997	Research Intern Interval Research, Palo Alto, CA, USA
April 1996 – April 2000	Research Assistant, Environmental Computing Research University of Guelph, ON, Canada
Oct. 1996 – April 1997	Director, Electronic Voting Project, Central Student Association University of Guelph, ON, Canada
March 1995 – June 1996	Research Assistant, Input Research Group, Dept. Computing and Info. Science University of Guelph, ON, Canada
May 1995 – Aug. 1995	Research Assistant, Polymer Physics, Dept. Physics University of Guelph, ON, Canada
May 1993 – Aug. 1993	Engineering Management Intern COM DEV, Cambridge, ON, Canada

Professional Service and Activities

Reviewer and program committee member (PC) where indicated

The International Conference on Computer Vision (ICCV)
The International Conference on Machine Learning (ICML) - PC
The European Conference on Computer Vision (ECCV)
The Conference, Computer Vision and Pattern Recognition (CVPR)
The Conference, Artificial Intelligence (AAAI) - PC
The Conference, Uncertainty in Artificial Intelligence (UAI)
The Conference, Knowledge Discovery and Data Mining (KDD) - PC
The Conference, Advances in Neural Information Processing Systems (NIPS)
The Conference, Artificial Intelligence and Statistics (AISTATS)
The Canadian Conference on Artificial Intelligence (CCAI)
The Conference, IEEE Visualization (VIS)
The International Journal of Remote Sensing (IJRS)
The Journal, IEEE Transactions on Pattern Analysis and Machine Learning (PAMI)
The Journal, IEEE Transactions on Neural Networks
The Journal, Computerized Medical Imaging and Graphics
The Journal, Pattern Recognition
The Journal, Machine Learning

University of Waterloo Committee Member

The Committee for Selecting the Director of the School of Computer Science (2002),
The Departmental Committee on Academic Appointments (2001-2002),
The External Relations and Graduate Student Recruitment Committees (2001-2002),
The CS Department Representative for the Graduates Student Association (2001-2002)

University of Rochester Committee Member

Computing Infrastructure Committee & Graduate Admissions Committee (2007-2008)

Volunteer Activities

The CS Seminar Series encouraging women to enter Computer Science (May 2002)

University of Waterloo, Waterloo Ontario

I gave a seminar on Artificial Intelligence and interactive music and made a CD-ROM.

CFRU 93.3 Community Radio (2000)

Guelph, Ontario

Volunteer helping with Internet audio streaming technologies.

Canadian Undergraduate Physics Conference Executive (April 1996- January 1997)

University of Guelph, Guelph, Ontario

Involved with the organization of various aspects of this national conference, including: fund raising, guest lecturers, informal speakers, advertising, industrial tours and numerous team projects.

Board of Directors of the University Centre (Nov. 1993- April 1997)

University Centre, University of Guelph, Guelph, Ontario

Responsible for general direction and policy for the University Centre. The University Centre houses administration, various levels of government, student clubs, the student newspaper, retail outlets and various common areas.

Awards, Honors & Scholarships

Ontario Graduate Scholarship	2003 and 2004, awarded twice
NSERC PGS B	2001, National Graduate Scholarship
Copernicus Scholarship in Physics	1994, Institutional Undergraduate Scholarship
Canada Scholarship	1993, National Undergraduate Scholarship
Valedictorian	1993, Glenview Park Secondary School

Delivered inaugural address on behalf of students on the occasion of the opening of the University of Waterloo School of Computer Science, (April 2002)

Selected Recent Talks

<i>Date</i>	<i>Organization</i>
Dec. 2006	Kodak Research, Rochester, NY
Dec. 2006	Genomic Sciences Centre, Vancouver, BC
Sept. 2006	Invention to Venture, University of Massachusetts Business School
Sept. 2006	Canadian Independent Media Arts Alliance - National Conference Speaker
July 2006	Microsoft Research Redmond, WA
May 2006	Microsoft Research Cambridge, UK
Oct. 2007	Cornell University / The Bill and Melinda Gates Foundation Workshop

Teaching

Fall 2007 CSC 290A - Computational Photography and Video (undergraduates only)
 Winter 2008 CSC 577 - Advanced Topics in Pattern Recognition (graduates only)
 CSC 290A and CSC 577 were new course offerings and I created the content for both courses.

Student Supervision

<i>Student</i>	<i>Description</i>
Bin Wei Fall 2007- , University of Rochester	Machine Learning, NLP and Bioinformatics PhD Candidate
Ross Messing (with H. Kautz) Fall 2007-, University of Rochester	Computer Vision – Motion Analysis PhD Candidate
Nicholas Morsillo (with R.Nelson) Fall 2007-, University of Rochester	Computer Vision – Object Recognition PhD Candidate
Chetan Bhole (with H. Kautz) Fall 2007- , University of Rochester	Computer Vision – Visual Vocabularies PhD Candidate
Lam Tran Fall 2007- , University of Rochester,	Computer Vision – Markov Random Fields Undergraduate Research Independent Study
Manju Jagalur 2006-2007, University of Massachusetts Amherst,	The Analysis of <i>in situ</i> Gene Expression in the Mouse Brain PhD Qualifying Synthesis Project
Richard Minerich 2006-2007, University of Massachusetts, Amherst,	Information Extraction and Geo-spatial Information Undergraduate Independent Study

I have worked with and/or have partly funded computer science PhD candidates: Xuerui Wang, Gerold Druck, Pallika Kanani, Charles Sutton, Jerod Weinman and Vidit Jain.

Publications, Summary

Refereed Journal Papers:	6
Refereed Conference Papers and Presentations:	18
Issued Patents:	1
Filed Patents:	3
Refereed Workshop Papers, Demonstration and Invited Contributions	8
Manuscripts currently under review	2

Refereed Journal Publications

1. Jagalur, M.N., **Pal, C.**, Learned-Miller, E., Zoeller, R. T., and Kulp, D. [Analyzing in situ Gene Expression in the Mouse Brain with Image Registration, Feature Extraction and Row Column Clustering](#). *BMC Bioinformatics*.vol. 8, suppl. 10, Dec. 21 2007.
2. Baudisch, P., Tan, D., Steedly, D., Rudolph, R., Uyttendaele, M., **Pal, C.** and Richard Szeliski. (2007) [An Exploration of User Interface Designs for Real-time Panoramic Photography](#). *Australian Journal of Information Systems (AJIS)*, vol. 13, no. 2.
3. Agarwala, A., Zheng, C., **Pal, C.**, Agrawala, M., Cohen, M., Curless, B., Salesin. D., and Szeliski, R. (2005) [Panoramic video textures](#). *In the proceedings of ACM SIGGRAPH 2005, ACM Transactions on Graphics*, vol. 24, issue 3, pp. 821-827.
4. Wen-Tao Peng, Mark D. Robinson, Sanie Mnaimneh, Nevan J. Krogan, Gerard Cagney, Quaid Morris, Armaity P. Davierwala, Jörg Grigull, Xueqi Yang, Wen Zhang, Nicholas Mitsakakis, Owen W. Ryan, Nira Datta, Vladimir Jovic, **Chris Pal**, Veronica Canadien, Dawn Richards, Bryan Beattie, Lani F. Wu, Steven J. Altschuler, Sam Roweis, Andrew Emili, Brendan J. Frey, Jack F. Greenblatt, and Timothy R. Hughes. (2003) [A Panoramic View of Yeast Non-Coding RNA processing](#). *Cell*, vol. 113, pp. 919-933.
5. **Pal, C.** Swayne, D. and Frey, B. (2001) [The Automated Extraction of Environmentally Relevant Features from Digital Imagery using Bayesian Multi-Resolution Analysis](#) . *Advances in Environmental Research*. vol. 5, issue 4, pp 435-444.
6. Dorner, S. Swayne, D. A., Rudra, R. P., **Pal, C.**, Newald, C. (2001) [Integrating Parametric Uncertainty and Modelling Results into an Advisory System for Watershed Management](#). *Advances in Environmental Research*. vol. 5, issue 4, pp. 445-451.

Refereed Conference Publications

7. Druck, G., **Pal, C.**, Zhu, X., and Andrew McCallum. (2007) [Semi-Supervised Classification with Hybrid Generative/Discriminative Methods](#). *In the proceedings of Knowledge Discovery and Data Mining (KDD)*.
8. Wang, X., **Pal, C.**, and McCallum, A. (2007) [Generalized Component Analysis for Text with Heterogeneous Attributes](#). *In the proceedings of Knowledge Discovery and Data Mining (KDD)*.
9. Scharstein, D. and **Pal, C.** (2007) [Learning Conditional Random Fields for Stereo](#). *In the proceedings of IEEE Computer Vision and Pattern Recognition, CVPR 2007*.
10. Kanani, P., McCallum, A. and **Pal, C.** (2007) [Improving Author Co-reference by Resource-bounded Information Gathering from the Web](#). *In the proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*.
11. **Pal, C.**, Sutton, C., and McCallum, A. (2006) [Sparse Forward-Backward using Minimum Divergence Beams for Fast Training of Conditional Random Fields](#). *In the proceedings of*

the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP).

12. McCallum, A., **Pal, C.**, Druck, G., and Wang, X. (2006) [Multi-Conditional Learning: Generative/Discriminative Training for Clustering and Classification](#). *In the proceedings of AAAI 2006.*
13. Kelm, M., **Pal, C.**, and McCallum, A. (2006) [Combining Generative and Discriminative Methods for Pixel Classification with Multi-Conditional Learning](#) *In the proceedings of ICPR 2006.*
14. **Pal, C.** and McCallum, A. (2006) [CC Prediction with Graphical Models](#). *In the proceedings of the Third Conference on Email and Anti-Spam, (CEAS).*
15. Steedly, D., **Pal, C.** and Szeliski, R. (2005) [Efficiently Registering Video into Panoramic Mosaics](#). *In the proceedings of the IEEE International Conference on Computer Vision, ICCV 2005, Beijing, China, October 15-21.*
16. Baudisch, P., Tan, D., Steedly, D., Rudolph, E., Uyttendaele, M., **Pal, C.**, and Szeliski, R. (2005) [Panoramic Viewfinder: providing a real-time preview to help users avoid flaws in panoramic pictures](#). *In the Proceedings of OZCHI 2005, Canberra, Australia, November 2005.*
17. **Pal, C.**, Szeliski, R., Uyttendaele, M. and Jojic, N. (2004) [Probability Models for High Dynamic Range Imaging](#). *In the Proceedings of IEEE Computer Vision and Pattern Recognition, CVPR 2004.* vol. 2, pp. 173-180.
18. **Pal, C.**, Frey, B. and Jojic, N. (2002) [Learning Montages of Transformed Latent Images as Representations of Objects that Change in Appearance](#). *In the proceedings of ECCV: The European Conference on Computer Vision, Springer-Verlag lecture notes in Computer Science, vol. 4, pp. 715-731.*
19. **Pal, C.**, Frey, B. and Kristjansson, T. (2002) [Noise Robust Speech Recognition Using Gaussian Basis Functions For Non-linear Likelihood Function Approximation](#). *In the proceedings of IEEE ICASSP: International Conference on Acoustics Speech and Signal Processing, Orlando, Florida May 13-17, 2002.*
20. **Pal, C.** and Hu, M. (2001) [Methodologies for Constructing and Training Large Hierarchical Hidden Markov Models for Sequence Analysis](#). *Research in Computational Biology. RECOMB 2001.* (Conference Poster Presentation). April 22-25, 2001.
21. **Pal, C.** Swayne, D. and Frey, B. (2000) [Image Interpretation and Segmentation with Hierarchical Probabilistic Models](#). *4th International Conference on Integrating GIS and Environmental Modeling (GIS/EM4).* Banff, Alberta , Canada, September 2-8, 2000.
22. Dorner, S., **Pal, C.** and Swayne, D.A. (1999) [Case Libraries and Information Theoretic Case Matching for Water Resource Management](#). *Proceedings of ISESS 1999, The International Symposium on Environmental Software Systems.*

23. **Pal, C.** (1998) [A Technique for Illustrating Dynamic Component Level Interactions Within a Software Architecture](#) . *Proceedings of CASCON 1998. The IBM Centre for Advanced Studies Conference*. pp. 134-146.
24. MacKenzie, I.S., Soukoreff, R.W., and **Pal, C.** (1997) [A two ball mouse affords three degrees of freedom](#). *Extended Abstracts of CHI 1997. The ACM Conference on Human Factors in Computing Systems*, pp. 303-304. New York: ACM.

Theses

25. **Pal, C.** (2004) [Probability Models for Information Processing and Machine Perception](#). *PhD Thesis*, University of Waterloo.
26. **Pal, C.** (2000) [A Probabilistic Approach to Image Feature Extraction, Segmentation and Interpretation](#). *Masters of Mathematics Thesis*, University of Waterloo.

Refereed Workshop, Demonstration and Invited Papers

27. **Pal, C.**, Mann, G., and Minerich, R. (2007) [Putting Semantic Information Extraction on the Map: Noisy Label Models for Fact Extraction](#). *To appear in the proceedings of the AAAI Workshop on Information Integration on the Web (IIWeb)*.
28. Jagalur, M., **Pal, C.**, Learned-Miller, E., Zoeller, R.T. and Kulp, D. (2006) [The Processing and Analysis of in situ Gene Expression Images of the Mouse Brain](#). *In Advances in Neural Information Processing Systems (NIPS) Workshop on New Problems and Methods in Computational Biology*. (Refereed Workshop paper)
29. **Pal, C.** Kelm, M., Wang, X., Druck, G. and McCallum, A. (2006) [On Discriminative and Semi-Supervised Dimensionality Reduction](#). *In Advances in Neural Information Processing Systems (NIPS) Workshop on Novel Applications of Dimensionality Reduction*. (Refereed Workshop paper)
30. **Pal, C.**, Wang, X. Kelm, M. and McCallum, A. (2005) [Multi-Conditional Learning for Joint Probability Models with Latent Variables](#). *NIPS 2005 Workshop: Advances in Structured Learning for Text and Speech Processing*. (Refereed Workshop paper)
31. Sutton, C., **Pal, C.** and McCallum, A. (2005) [Sparse Forward-Backward for Fast Training of Conditional Random Fields](#). *NIPS 2005 Workshop: Advances in Structured Learning for Text and Speech Processing*. (Refereed Workshop paper)
32. **Pal, C.** and Jovic, N. (2005) [Interactive Montages of Sprites for Indexing and Summarizing Security Video](#). *In the Video Proceedings of IEEE Computer Vision and Pattern Recognition, CVPR 2005*. vol. 2, pp. 1192. (Refereed Demonstration)

33. Baudisch, P., Tan, D., Steedly, D., Rudolph, E., Uyttendale, M., **Pal, C.**, and Szeliski, R. [Panoramic Viewfinder: shooting panoramic pictures with the help of a real-time preview](#) . UIST 2005 Companion (Demonstration paper), Seattle, WA, October 2005.
34. **Pal, C.** (2001) [Probabilistic Models and Decision Problems](#). Presentation at the *International Symposium for Environmental Software Systems, ISESS 2001*, Banff, Alberta, Canada, May 22-25, 2001. (Invited contribution)

Issued Patents

35. **Pal, C.**, Slaney, M. and Adams, R. (2000) [Sound-based Event Control Using Timbral Analysis](#). *United States Patent number: 6,054,646*.

Patent Applications

36. Baudisch, P., **Pal, C.**, Rudolph, E., Steedly, D., Szeliski, R., Tan, D., Uyttendaele, M. (2007) [Real-time preview for panoramic images](#). United States Patent Application #20070025723. Appears Feb, 2007. Filed July 2005.
37. **Pal, C.**, Steedly, D., and Szeliski, R. (2007) [Video registration and image sequence stitching](#). United States Patent Application #20070031062. Appears Feb, 2007. Filed Aug. 2005.
38. Jojic, N. and **Pal, C.** (2006) [Interactive montages of sprites for indexing and summarizing video](#). United States Patent Application #20060117356. Appears June, 2006. Filed Dec. 2004.