

## Faculty

- Doug Crawford      Assistant Professor of Psychology and Biology.  
Interests: three-dimensional eye and head movements, visuomotor neurophysiology.
- James Elder        Assistant Professor of Psychology.  
Project Leader, Human Performance Laboratory.  
Interests: visual psychophysics, computational vision, image coding.
- Keith Grasse       Associate Professor of Psychology and Biology.  
Project Leader, Human Performance Laboratory.  
Interests: neurophysiology of the visual system, eye movements, auditory, neurophysiology, neuropharmacology.
- Laurence Harris    Professor of Psychology and Biology.  
Project Leader, Human Performance Laboratory.  
Interests: neurophysiology and psychophysics of visual, vestibular and oculomotor systems.
- Ian Howard         Distinguished Research Professor of Psychology and Biology.  
Director of the Centre for Vision Research.  
Co-Director of the Human Performance Laboratory.  
Interests: space perception, eye movements, visual-vestibular interactions.
- Michael Jenkin      Associate Professor and Chair of Computer Science.  
Project Leader, Human Performance Laboratory.  
Interests: computer vision, robotics and image understanding.
- Peter K. Kaiser     Professor Emeritus of Psychology and Biology  
Interests: colour science, auditory scene and distance, eye movements.
- Evangelos E. Milios Associate Professor of Computer Science.  
Interests: computer vision, computational auditory scene analysis, human-computer interaction.
- Hiroshi Ono         Professor of Psychology.  
Project Leader, Human Performance Laboratory.  
Interests: visual perception of direction and distance, eye movements.
- Jonathan Ostroff    Associate Professor of Computer Science.  
Research Associate, Human Performance Laboratory.  
Interests: real-time systems, control systems.
- David Regan         CAE/NSERC Industrial Research Professor.  
Distinguished Research Professor of Psychology and Biology, York University.  
Professor of Ophthalmology and Medicine, University of Toronto.  
Co-Director, Human Performance Laboratory.  
Fellow of the Royal Society of Canada.

Interests: psychophysics of spatial vision, motion, stereopsis, colour vision, vision aviation, visually evoked magnetic and electrical brain activity, visual disorders, auditory psychophysics.

Josée Rivest Associate Professor of Psychology, Glendon College  
Interests: multiple attributes in localization of contours and perceptual learning.

### **Faculty cont'd.**

Paul Stager Professor of Psychology.  
Research Associate, Human Performance Laboratory.  
Interests: human factors in aerospace performance and system design.

Martin Steinbach Professor of Psychology and Biology, York University  
Director, The Eye Research Institute of Canada.  
Professor of Ophthalmology, University of Toronto.  
Senior Scientist, Dept. of Ophthalmology, Hospital for Sick Children.  
Director of Research, Department of Ophthalmology, University of Toronto.  
Interests: eye movements, visual-motor coordination, clinical disorders of the oculomotor system.

Evan Thompson Assistant Professor of Philosophy  
Interests: philosophical foundations of cognitive science, the philosophy of psychology, and the philosophy of perception.

Laurie Wilcox Assistant Professor of Psychology.  
Interests: stereopsis/depth perception.

### **Research Associates**

Dr. Bob Cheung	With I.P. Howard
Dr. Reuben Gellman	With M. Steinbach
Dr. Esther Gonzalez	With M. Steinbach
Dr. Xiang-Hua Hong	With D. Regan
Linda Lillakas	With H. Ono and M. Steinbach
Heather Jenkin	With I.P. Howard
Dr. Maureen Reed	With M. Steinbach
Dr. Marian Regan	With D. Regan
Marita Roussou	With E. Miliou
Jim Zacher	With I.P. Howard

### **Post Doctoral Fellows**

Dr. Elizabeth Irving	With M. Steinbach
Dr. Masahiro Ishii	With I.P. Howard
Dr. Masayuki Sato	With I.P. Howard
Dr. Stephen Palmisano	With I.P. Howard
Dr. Makoto Ichikawa	With H. Ono
Dr. Shoji Sunaga	With P. Kaiser

### **Visiting Scientists 1997-98**

Dr. Andy Clarke	Benjamin Franklin Klinikum, Berlin
Dr. Brian Rogers	Oxford University, U.K.
Dr. Kenzo Sakurai	Tohoku Gakuin University, Japan
Dr. Stuart Anstis	University of San Diego, LaJolla

### Visiting Scientists 1998-99

Dr. S. Doi	Toyota Research Laboratory, Japan
Dr. Casper Erkelens	University of Utrecht
Dr. Kwonsaeng Park	Department of Psychology, Keimyung University
Dr. Brian Rogers	Oxford University, U.K.
Dr. Kenzo Sakurai	Tohoku Gakuin University, Japan.
Masahiro Suzuki	Grad Student, Chukyo University, Nagoya, Japan working with Dr. Ono
Dr. M. Swanston	University of Abertay Dundee, Scotland
Dr. N. Wade	Dundee University, Scotland

### Graduate students

### Supervisor

Robert Allison	Obtained Ph.D. in Spring, 1998
Nicole Aucoin	3rd year M.Sc. Jenkin
Isabelle Boutet	2nd year M.A. Rivest
Melike Ceylan	1st year M.A. Crawford
Dalia Darwish	1st year M.Sc. Howard
Xueping Fang	Obtained M.Sc. in Fall, 1997
Richard Goldberg	2nd year M.Sc. Elder
Rob Gray	Obtained Ph.D. in Summer, 1998
Philip Grove	1st year Ph.D. Ono
Lorraine Gunther	3rd year M.A. Ono
Yeola Harris	2nd year M.A. Wilcox
Denise Henriques	1st year Ph.D. Crawford
Ghee Ho	6th year Ph.D. Stager
Gang Hu	1st year M.Sc. Howard
Iraj Mantegh	2nd year Ph.D. Jenkin
Radha Kohly	2nd year M.A. Regan
Agnieszka Kopinska	2nd year M.A. Harris
Eliana Klier	1st year Ph.D. Crawford
Dan Kriechman	2nd year M.Sc. Harris
Jochen Lang	Obtained M.Sc. in Fall, 1997
Arlene Lipsman	1st year M.Sc. Jenkin
Lewis Lo	2nd year M.Sc. Ostroff
Peter Mente	2nd year Ph.D. Harris
Zusheng Rao	2nd year M.Sc. Milios
Yiannis Rekleitis	2nd year Ph.D. Milios
Matt Robinson	3rd year M.Sc. Jenkin
Greg Reid	2nd year M.Sc. Milios
Michael Smith	1st year Ph.D. Crawford
Jennifer Steeves	2nd year Ph.D. Steinbach
Ken Tam	Obtained M.Sc. in Summer, 1998
Sherry Trithart	2nd year M.A. Elder
Susanna Yanivker	2nd year M.Sc. Grasse
Dan Zikovitz	2nd year M.Sc. Harris

## Students Arriving Sept. 1998

Scott Duggan	1st year MA.	Regan
Dimitrios Llianos	1st year M.Sc.	Crawford
Fara Redlick	1st year M.Sc.	Harris
Adam Sachs	1st year M.Sc.	Elder
Liliana Velisavljevic	1st year Ph.D.	Elder
Jennifer Warner	1st year M.A.	Rivest

## E. Lynn Kirshner Memorial Scholarship for 1997

The Lynn Kirsher Scholarship for 1997 was shared amongst 3 students:

**Jochen Lang, M.Sc.** Student in Computer Science, for Actively building models with VIRTUE.

*Proceedings of the 3rd Asian Conference on Computer Vision*, in press.

**Rob Gray, Ph.D.** Student in Psychology, for Accuracy of estimating time to collision using binocular and monocular information. *Vision Research*, in press.

**Carol Dengis, Ph.D.** Student in Psychology, for Registered eye position: short- and long-term effects of botulinum toxin injected into eye muscle. *Experimental Brain Research*, 1998, 119, 475-482.

## Research Grants (Annual for 1997/98)

Ontario Centre of Excellence Grant - Elder, Grasse, Harris, Howard, Jenkin, Ono and Regan, HP Lab	456,000
Ontario Research and Development Fund (ORDCF)	76,000
<b>Crawford</b>	
MRC Operating Grant. Brainstem control of 3-D eye and head movements	88,441
MRC Scholarship. Neural control of 3-D eye and head movements	59,000
NSERC Research Grant. Human eye, head, and arm movements in 3-D space	21,000
Sloan Fellowship	23,777
<b>Elder</b>	
IRIS Research Grant, with J. Tsotos, Toronto and J. Clark, McGill	100,000
Contract with DND DRDB, with P. Shepherd, CRESTech	50,000
NSERC Research Grant	25,000
Crestech Opportunity Fund, with Tsotos, U. of T.	20,000
Faculty of Arts Computer Matching Award	1,800
<b>Grasse</b>	
NSERC Operating Grant	28,000
NSERC Equipment Grant	20,000
<b>Harris</b>	
NSERC Operating Grant. The detection of conflict in visual-vestibular interactions	29,000
NSERC Collaborative Research Grant, with Michael Jenkin	68,000
<b>Howard</b>	
NSERC Operating Grant. Spatio-temporal disparity detection and vergence	39,000
NASA. Visual orientation in unfamiliar gravito-inertial environments	70,840
DCIEM Contract. Post-rotary effects on attitude perception during rolling manoeuvre	78,000
DCIEM Contract. Effects of noisy disparity in stereoscopic virtual-reality systems	77,250
CSA Contract. Experiments on the Neurolab Space Shuttle mission	67,517
<b>Jenkin</b>	
NSERC Operating Grant. Embedded stereo vision	23,000
NSERC Equipment Grant, with G. Dudek	68,351
CITO Grant, with Y. Lesperance	75,000
CITO Grant, with J. Tsotos and E. Milios	50,000
<b>Kaiser</b>	

NSERC Operating Grant. Studies in colour vision	29,000
<b>Milios</b>	
NSERC Operating Grant. Computational auditory scene analysis	25,500
PWGSC Contract. Numeric and symbolic processing for sonar info. management with Jenkin	20,000
<b>Ono</b>	
NSERC Operating Grant. Sensory and motor aspects of space perception	30,500
ATR Human Information Processing Laboratories. Vertical disparity and visual direction. US\$10,000. @1.44 Can	14,400
Faculty of Arts Research Grant. Accommodative vergence	3,975
<b>Ostroff</b>	
NSERC Operating Grant	26,000
<b>Regan</b>	
NSERC/CAE Industrial Chair	132,452
NSERC Operating Grant	71,000
AFOSR Grant	246,622
<b>Rivest</b>	
NSERC Operating Grant. The role of attention on processing multiple attributes images	18,000
<b>Steinbach</b>	
NSERC Operating Grant. Human oculomotor control	38,750
<b>Evan Thompson</b>	
SSHRC Standard Research Grant. The human consciousness of time: Phenomenology and cognitive science	28,920
<b>Wilcox</b>	
NSERC Women's Faculty Award	35,000
MRC Research Grant	28,000
MRC Equipment Grant, with R. Hess, McGill	14,100
NSERC Research Grant	20,000
NSERC Equipment Grant	24,000
<b>Total annual value of grants</b>	<b>\$2,457,195</b>

### Publications July 1997-June 1998

#### Books

Harris, L.R. and Jenkin, M. (Eds.) *Vision and Action*. Cambridge University Press, Cambridge, UK, 1998, in press.

#### Chapters in Books

Crawford, J.D., Vilis, T. and Guitton, D. (1997) Neural coordinate systems for head-fixed and head-free gaze shifts. In M. Fetter, H. Misslisch, and D. Tweed (Eds.) *Three-Dimensional Kinematic Principles of Eye, Head, and Limb Movements in Health and Disease*, Harwood: Amsterdam, pp. 43-56.

Crawford, J.D. (1997) Geometric Transformations in the visual-motor interface for saccades. In M. Fetter, H. Misslisch, and D. Tweed (Eds.) *Three-Dimensional Kinematic Principles of Eye, Head, and Limb Movements in Health and Disease*, Harwood: Amsterdam, pp. 85-100.

Crawford, J.D. (1998) Listing's law: What's all the hubbub? In L.R. Harris and M. Jenkin (Eds.) *Vision and Action*, Cambridge University Press, UK, in press.

Harris, L.R., Zikovitz, D.C. and Kopinska, A. (1998) Frames of reference with examples from driving and auditory localization. In L.R. Harris and M. Jenkin (Eds.) *Vision and Action*, Cambridge University Press, Cambridge, UK, in press.

Harris, L.R. and Jenkin, M. (1998) Vision and action. In L.R. Harris and M. Jenkin (Eds.) *Vision and Action*, Cambridge University Press, Cambridge, UK, in press.

Howard, I.P. (1998) The fidelity of disparity-based stereopsis in helmet-mounted displays. In L. Hettinger, *Virtual Reality Systems*, New York: Elsevier, in press.

Bialystok, E. and **Jenkin, H.** (1998) L'espace interne: comment les représentations mentales affectent la rotation mentale. In J. Bideaud and Y. Courbois (Eds.) *Image Mentale et Développement: de la Théorie*

- Piagetienne aux Neurosciences Cognitives*, Paris, PUF, pp 55-77.
- Uhlin, T. and Jenkin, M. (1997) Real time issues for active vision hardware. In H. Christensen and J. Crowley (Eds.) *Active Vision Hardware*, Kluwer, in press.
- Coombs, D. and Jenkin, M. (1997) The geometry of active binocular vision. In H. Christensen and J. Crowley (Eds.) *Active Vision Hardware*, Kluwer, in press.
- Ono, H. and Gonda, G. (1997) Apparent motion based on changing phoria. In I. Rock (Ed.) *Indirect Perception*, Cambridge: MIT Press, pp. 265-276.
- Ono, H. (1998) Aftereffects of Bill Dember in Motion. In R. Hoffman, M. Sherrick and J. Warm (Eds.) *A Tribute to William N. Dember*, Department of Psychology, University of Cincinnati, pp. 16-18.
- Ono, H., Sato, T. Shioiri, S. and Ujike, H. (1998) An aftereffect of Bill Dember in motion: Probing the signal for motion parallax. In R. Hoffman, M. Sherrick and J. Warm (Eds.) *Viewing psychology as a whole: The integrative science of William N. Dember*. Washington, DC: American Psychological Association, pp. 59-82.
- Regan, D., Gray, R., Portfors, C.V., Hamstra, S.J., Vincent, A., Hong, X.H., Kohly, R. and Beverley, K.I. (1998) Catching, hitting and collision avoidance. In L.R. Harris and M. Jenkin (Eds.) *Vision and Action*, Cambridge University Press, UK, in press.
- Stager, P. (1998) Panel contributor to C. Wickens, A. Mavor, R. Parasuraman and J. McGee (Eds.) *The Future of Air Traffic Control: Human Operators and Automation*. (Prepared by the U.S. National Research Council Panel on Human Factors in Air Traffic Control Automation). Washington, DC: National Academy Press.
- Stager, P. (1998) Achieving the objectives of certification through validation: Methodological issues. In J. Wise and V.D. Hopkin (Eds.) *Human Factors Certification*, Mahwah, NJ: Lawrence Erlbaum Associates, in press.
- Thompson, E. (1998) Comparative colour vision: quality space and visual ecology. In B. Funt (Ed.) *Colour Perception*. Vancouver Studies in Cognitive Science. Toronto and New York: Oxford University Press, in press.
- Thompson, E., Noë, A. and Pessoa, L. (1998) Perceptual completion: a case study for phenomenology and cognitive science. In J. Petitot, J-M. Roy, B. Pachoud and F.J. Varela (Eds.) *Naturalizing phenomenology: Issues in Contemporary Cognitive Science and Phenomenology*. Stanford University Press, in press.

### **Papers in Refereed Journals**

- Allison, R.S., Eizenmann, M., Tomlinson, R.D., Nedzekleski, J. and Sharpe, J.A. (1997) Vestibulo-ocular reflex deficits to rapid head turns following intratympanic gentamicin instillation. *Journal of Vestibular Research*, 7, 369-380.
- Crawford, J.D. and Guitton, D. (1997) Primate head-free saccade generator implements a desired (post-VOR) eye position command by anticipating intended head motion. *Journal of Neurophysiology*, 78, 2811-2816.
- Dengis, C., Simpson, T., Steinbach, M.J. and Ono, H. (1998) The cyclops effect in adults: Sighting without visual feedback. *Vision Research*, 38, 327-331.
- Dengis, C A., Steinbach, M.J. and Kraft, S.P. (1998) Registered eye position: Short- and long-term effects of botulinum toxin injected into eye muscle. *Experimental Brain Research*, 119, 475-482.
- Elder, J.H. and Zucker, S.W. (1998) Evidence for boundary-specific grouping in human vision. *Vision Research*, 38, 143-152.
- Elder, J.H. and Zucker, S.W. (1998) Local scale control for edge detection and blur estimation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 20, 7, 699-716.
- Elder, J.H. (1998) Are edges incomplete? *International Journal of Computer Vision*, in press.
- Gray, R. and Regan, D. (1997) Accuracy of estimating time to collision using binocular and monocular information. *Vision Research*, 38, 499-512.

- Gray, R. and Regan, D. (1997) Estimating time to collision using binocular retinal image information alone, monocular retinal image information alone and a combination of the two. *Vision Research*, in press.
- Gray, R. and Regan, D. (1997) Spatial frequency discrimination and detection characteristics for gratings defined by orientation texture. *Vision Research*, in press.
- Gray, R. and Regan, D. (1998) Motion in depth: adequate and inadequate simulation. *Perception and Psychophysics*, in press.
- Gray, R. and Regan, D. (1998) Adapting to expansion increases perceived time to collision. *Vision Research*, in press.
- Harris, L.R., Jenkin, M., and Zikovitz, D.C. (1998) Vestibular cues and virtual environments. *Proceedings of the IEEE Virtual Reality Annual International Symposium (VRAIS)*, pp. 133-138.
- Henriques, D.Y.P., Klier, E.M., Smith, M.A., Lowy, D. and Crawford, J.D. (1998) Gaze centered remapping of remembered visual space in an open-loop pointing task. *Journal of Neuroscience*, 18, 1583-1594.
- Howard, I.P., Allison, R.S. and Zacher, J.E. (1997) The dynamics of vertical vergence. *Experimental Brain Research*, 116, 153-159.
- Howard, I.P. (1998) Seeing in reverse. *Nature*, 389, 235-236.
- Howard, I.P., Zacher, J. and Allison, R. (1997) Postrotary nystagmus and turning sensations after active and passive turning. *Journal of Vestibular Research*, 8, 1-14.
- Howard, I.P. and Pierce, B.J. (1998) Types of shear disparity and the perception of surface inclination. *Perception*, 27, 129-145.
- Kaneko, H. and **Howard, I.P.** (1997) Spatial limitation of vertical-size disparity processing. *Vision Research*, 37, 2871-2878.
- Pierce, B.J., **Howard, I.P.** and Feresin, P. (1998) Depth interactions between inclined and slanted surfaces in vertical and horizontal orientations. *Perception*, 27, 105-122.
- Pierce, B.J. and **Howard, I.P.** (1997) Types of size disparity and the perception of surface slant. *Perception*, 26, 1503-1517.
- Spillmann, L., Anstis, S., Kurtenbach, A. and **Howard, I.P.** (1997) Reversed visual motion and self-sustaining eye oscillations. *Perception*, 26, 823-830.
- Nickerson, B., Jasiobedzki, P., Wilkes, D., **Jenkin, M.**, **Milios, E.**, Tsotsos, J., Jepson, A. and Bains, O.N. (1998) An autonomous robot for a known industrial environment. *Robotics and Autonomous Systems*, in press.
- Tsotsos, J. K., Verghese, G., Dickinson, S., **Jenkin, M.**, Jepson, A., **Milios, E.**, Nuflo, F., Stevenson, S., Black, M., Metaxas, D., Cluhane, S., Ye, Y. and Mann, R. (1998) PLAYBOT: A visually-guided robot for physically disabled children. *Image and Vision Computing*, 16, 275-292.
- Kohly, R. and Regan, D. (1998) Evidence for a mechanism sensitive to the speed of cyclopean form. *Vision Research*, in press.
- Shimono, K., Egusa, H. and **Ono, H.** (1997) Binocular single vision: the limitation of the fusion and suppression theories. *Shinrigaku Hyoron (Japanese Psychological Review)*, 40, 414-431. (In Japanese.)
- Papers in Refereed Journals cont'd.**
- Shimono, K., **Ono, H.**, Saida S. and Mapp, A.P. (1998) Methodological caveats for monitoring eye position with Nonius stimuli. *Vision Research*, 38, 591-600.
- Mapp, A.P. and **Ono, H.** (1998) Wondering about the wandering cyclopean eye. *Vision Research*, in press
- Nakamizo, S., **Ono, H.** and Ujike, H. (1997) Subjective staircase: A variation of the wallpaper illusion. *Perception and Psychophysics*, in press.
- Ostroff, J.S. (1998) Refinement and composition of real-time systems. *ACM Transactions on Software Engineering Methodology*, in press.

- Reed, M.J., Steeves, J. and Steinbach, M.J. (1997) A Comparison of contrast letter thresholds in unilateral eye enucleated subjects and binocular and monocular control subjects. *Vision Research*, 37, 2465-2469.
- Portfors-Yeomans, C.V. and **Regan, D.** (1997) Just-noticeable difference in the speed of cyclopean motion in depth and of cyclopean motion within a frontoparallel plane. *Journal of Experimental Psychology: Human Perception and Performance*, in press.
- Regan, D. (1997) Visual factors in catching and hitting. *Journal of Sports Sciences*, 15, 533-558.
- Portfors-Yeomans, C.V. and **Regan, D.** (1997) Discrimination of the direction and speed of a monocularly-visible target from binocular information alone. *Journal of Experimental Psychology: Human Perception and Performance*, 23, 227-243.
- Portfors, C.V. and **Regan, D.** (1997) Just-noticeable difference in the speed of cyclopean motion in depth and of cyclopean motion within a frontoparallel plane. *Journal of Experimental Psychology: Human Perception and Performance*, 23, 1074-1086.
- Regan, D. (1998). Spatial vision for form rendered visible by luminance contrast, color contrast, motion contrast texture contrast and binocular disparity. *Spatial Vision*, in press.
- Giaschi, D. and **Regan, D.** (1997) The development of motion - defined figure -ground segregation in preschool and older children, using a letter - identification task. *Optometry and Vision Science*, 74, 761-767.
- Voisin, A., Elliott, D.B. and **Regan, D.** (1997) Babe Ruth: With vision like that, how could he play baseball? *Optometry and Vision Science*, 74, 144-146.
- Giaschi, D., Lang, A. and **Regan, D.** (1997) Reversible dissociation of sensitivity to dynamic stimuli in Parkinson's disease: Is magnocellular function essential to reading motion-defined letters. *Vision Research*, 37, 3531-3534.
- Kwan, L. and **Regan, D.** (1998) Orientation - tuned spatial filters for texture - defined form. *Vision Research*, in press.
- Irving, E.L., Goltz, H.C., **Steinbach, M.J.** and Kraft, S.P. (1998) Vertical latent nystagmus component and vertical saccadic asymmetries in subjects with dissociated vertical deviation. *Journal of the American Association for Pediatric Ophthalmology and Strabismus*, in press.
- Pessoa, L., **Thompson, E.** and Noë, A. (1998) Finding out about filling in: a guide to perceptual completion for visual science and the philosophy of perception. *Behavioral and Brain Sciences ("Target Article")*, in press.
- Thompson, E. (1997) Symbol Grounding: A bridge from artificial life to artificial intelligence. *Brain and Cognition*, 34, 48-71.
- Wilcox, L.M. and Hess, R.F. (1998) When stereopsis does not improve with increasing contrast. *Vision Research*, in press.
- Wilcox, L.M. and Hess, R.F. (1997) Scale selection for 2nd-order (non-linear) stereopsis. *Vision Research*, 37, 2981-2992.
- Zikovitz, D.C. and Harris, L.R. (1998) Head tilt during driving. *Ergonomics*, in press.

### Published Abstracts and Proceedings

- Allison, R.S. and Howard, I.P., Rogers, B.J. and Bridge, H. Temporal characteristics of stereoscopic slant perception. *Perception*, 1998, 26, 1327.
- Allison, R.S. and Howard, I.P. Disparity-perspective interactions in slant perception. *Investigative Ophthalmology and Visual Science*, 1998, 39, S626.
- Andersen, R.A., Goldberg, M.E., **Crawford, J.D.** and Klein, D. Maintaining stable spatial representations (Symposium) *Society for Neuroscience Abstracts*, 24, 1998, in press.

### Published Abstracts and Proceedings cont'd.

- Ceylan, M., Henriques, D., Llanos, D., Tweed, D. and Crawford, J.D. Context-dependent visual-motor adaptation of eye-head coordination in humans and monkeys. *Society for Neuroscience Abstracts*, 24, 1998, in press.
- Elder, J.H., Trithart, S., Pintilie, G. and MacLean, D. Rapid processing of cast and attached shadows. *Investigative Ophthalmology and Visual Science*, 1998, 39, S853.
- Elder, J.H. and Goldberg, R. Interactive contour editing. *IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, Santa Barbara, IEEE CS Press, 1998, 374-381.
- Elder, J.H. Brightness filling-in of natural images. *European Conference on Visual Perception (Helsinki)*, *Perception*, 26, 1997, suppl. 57.
- Fang, X., Howard, I.P., Allison, R. S. and Zacher, J.E. Effects of stimulus size and eccentricity on horizontal vergence. *Investigative Ophthalmology and Visual Science*, 1998, 39, S1046.
- Gonzalez, E.G., Steeves, J.K.E. and Steinbach, M.J. Perceptual learning for motion-defined letters in unilaterally enucleated observers and monocularly viewing normal controls. *Investigative Ophthalmology and Visual Science*, 1998, 39, S400.
- Gray, R. and Regan, D. The relevance of heading and motion-in-depth data collected with constant-sized dot displays. *Investigative Ophthalmology and Visual Science*, 1998, 39, S892.
- Grove P.M. and Ono, H. Ecologically invalid monocular texture leads to longer perceptual latencies in random dot stereograms. *Investigative Ophthalmology and Visual Science*, 1998, 39, 2901.
- Harris, Y. and Wilcox, L.M. Depth capture by 2nd-order stereopsis. *Investigative Ophthalmology and Visual Science*, 1998, 39, S615.
- Henriques, D.Y.P. and Crawford, J.D. Visual-motor miscalibrations of remembered vertical & oblique retinal errors when pointing. *Society for Neuroscience Abstracts*, 24, 1998, in press.
- Howard, I.P., Allison, A.R. and Howard, A. Depth from moving uncorrelated random-dot displays. *Investigative Ophthalmology and Visual Science*, 1998, 39, S669.
- Ishii, M. and **Howard, I.P.** Appearance of superimposed surfaces with different vertical disparities. *Investigative Ophthalmology and Visual Science*, 1998, 39, S618.
- Jenkin, H.L. and Howard, I.P. Retinal and gravitational frames of reference in ambiguous figure recognition. *Investigative Ophthalmology and Visual Science*, 1998, 39, S1094.
- Jenkin, M., and Jasiobedzki, P. Computation of stereo disparity for space materials. *IEEE/RSJ IROS*, Victoria, BC, 1998, in press.
- Mantegh, I., **Jenkin, M.R.M.** and Goldenberg, A.A. A novel path planning behavior for autonomous mobile robots using a non-linear control scheme. *World Automation Congress, 1998 (WAC '98)*, Anchorage, Alaska, 1998, in press.
- Mantegh, I., **Jenkin, M. R. M.** and Goldenberg, A.A. A probability-based approach to model-based path planning. *Proceedings of IEEE/RSJ IROS '97*, Grenoble, France, 1997, 1189-1195.
- Dudek, G., **Jenkin, M., Milios, E.** and Wilkes, D. On building and navigating with a local metric environmental map. *Third ECPD International Conference on Advanced Robotics, Intelligent Automation and Active Systems*, Bremen, Germany, 1997, 132-144.
- Dudek, G., **Jenkin, M., Milios, E.** and Wilkes, D. Topological exploration of unknown environments with multiple robots. *ISORA 98*, Anchorage, Alaska, in press.
- Mantegh, I., **Jenkin, M.R.M.** and Goldenberg, A.A. Reformulating the potential field method for goal-attaining, real-time path planning. *Third ECPD International Conference on Advanced Robotics, Intelligent Automation and Active Systems*, Bremen, Germany, 1997, 132-144.
- Jenkin, M., Elder, J.H. and Pintilie, G. Loosely-coupled telepresence through the panoramic image server. Accepted for *Vision Interface*, Vancouver, June, 1998.
- Klier, E.M., Guitton, D. and Crawford, J.D. Trajectories and 3-D fixation ranges of the eye and head during large gaze shifts in the monkey. *Society for Neuroscience Abstract*, 24, 1998, in press.

- Kohly, R.P. and Regan, D. Independent encoding of speed and displacement for a moving cyclopean grating. *Investigative Ophthalmology and Visual Science*, 1998, 39, S462.
- Kopinska, A., Harris, L.R. (1998) Mapping auditory onto visual space: the effect of eye and head position. *Investigative Ophthalmology and Visual Science*, 1998, 39, S1093.
- Lillakas, L., Ono, H. and Grove P.M. The visual system's solution to Leonardo da Vinci's paradox when both the occluder and the background are fused. *Investigative Ophthalmology and Visual Science*, 1998, 39, 2855.
- Ono, H. and Lillakas, L. The visual system's solution to Leonardo da Vinci's paradox. (Invited) *Proceedings of the fourth international display workshops*, Nagoya, Japan, 1997, 4, 831-834.

#### **Published Abstracts and Proceedings cont'd.**

- Ono, H., Ohtsuka, S. and Lillakas, L. The visual system's solution to Leonardo da Vinci's paradox and to the problems created by the solution. *Proceeding for The Workshop on Visual Cognition*, 1998, 125-136.
- Sakurai, K. and **Ono, H.** Depth/motion trade-off in viewing motion parallax display with lateral head movements. The 37th symposium of Tohoku University Research Institute of Electrical Communication, Sendai, Japan. *Proceedings of the 37th symposium of TURIEC*, 1997, 181-186.
- Suzuki, M., Segal, O., Lillakas, L. and **Ono, H.** The visual system's solution to Leonardo da Vinci's paradox when retinal disparity between the occluder and the background is large. *Investigative Ophthalmology and Visual Science*, 1998, 39, S618.
- Ohtsuka, S. and **Ono, H.** Adjustment for displacement and compression triggered by pictorial cue of occlusion produces correct 3-D perception and Kanizsa's illusion. *Investigative Ophthalmology and Visual Science*, 1998, 39, S850.
- Ichikawa, M. and **Ono, H.** The motion illusion from flickering elements, with head movement, as a function of apparent velocity. *Japanese Vision Society Meeting*, Tokyo, Japan. *Vision*, 1997, 9, 181-184.
- Ostroff, J.S. A Visual Toolset for the Design of Real-Time Discrete Event Systems. *IEEE Trans. on Control Systems Technology*, 1997, 5, 320-337.
- Kwan, L. and **Regan, D.** Orientation-tuned spatial mechanisms for texture-defined form. *Investigative Ophthalmology and Visual Science*, 1998, 39, S650.
- Rivest, J., Intriligator, J., Suzuki, S. and Warner, J. A shape distortion effect that is size invariant. *Investigative Ophthalmology and Visual Science*, 1998, 39, S853.
- Suzuki, S. and **Rivest, J.** Interactions among "aspect-ratio channels". *Investigative Ophthalmology and Visual Science*, 1998, 39, S855.
- Sato, M. and Howard, I.P. Effects of perspective cue on stereoscopic depth contrast of inclined surfaces. *Investigative Ophthalmology and Visual Science*, 1998, 39, S624.
- Smith, M.A. and Crawford, J.D. Accounting for 3-D eye rotations in the mechanisms for spatial memory and visuomotor transformation. *Society for Neuroscience Abstract*, 24, 1998, in press.
- Steeves, J.K.E., Gonzalez, E.G., Steinbach, M.J. and Gallie, B.L. Detection and recognition of texture and motion-defined letters in unilaterally enucleated observers and monocularly and binocularly viewing normal controls. *Investigative Ophthalmology and Visual Science*, 1998, 39, S402.
- Goltz, H.C., Irving, E.L. and **Steinbach, M.J.** Consequences of vertical ocular drift on vertical saccades to kinesthetic targets. *Investigative Ophthalmology and Visual Science*, 1998, 39, S762.
- Wilcox L.M., Copp, M.E. and Moroz-Harris, A. Symmetry perception: The role of local grouping. *Investigative Ophthalmology and Visual Science*, 1998, 39, S170.
- Zacher, J.E., Irving, B.I., Allison, R.S. and Callander, M.E., Effects of scleral search coil wear on visual function and acuity. *Investigative Ophthalmology and Visual Science*, 1998, 39, S767.
- Zikovitz, D., Harris L.R., Jenkin, M. and Kreichman, D. Vestibular dominance in estimating the distance of self motion: misaligned optic flow and vestibular cues. *Investigative Ophthalmology and Visual Science*, 1998, 39, 5063.

#### **Conference Presentations**

- Elder, J.H. and Goldberg, R. The statistics of natural image contours. *IEEE Workshop on Perceptual Organization in Computer Vision*, Santa Barbara, June, 1998.
- Harris, L.R. and Kopinska, A. The effects of eye and head position on auditory localization. *BBCS*, Ottawa, 1998.
- Harris, L.R., Jenkin, M. and Zikovitz, D. *Barany Satellite* (Germany), 1998.
- Henriques, D.Y.P. and Crawford, J.D. Coding of remembered visual space in a dynamic retinotopic map while pointing toward briefly flashed targets. *Conference for Research on Action and Perception*, Queens U., June 1998.
- Howard, I.P. Visual requirements for stereoscopic flight simulators. *Joint Conference on Display Systems*. DCIEM, Toronto, July, 1998.
- Lang, J., and **Jenkin, M.** Actively building models with VIRTUE. This paper was awarded the 1997 E. Lynn Kirshner Award for research in Vision Science at York University. *ACCV'98*, Hong Kong, 1998.
- Jenkin, M. and Dymond, P. A plugin-based privacy scheme for world wide web file distribution. *31st Hawaii International Conference on System Sciences*, January, 1988.

### Conference Presentations cont'd.

- Mantegh, I., **Jenkin, M.R.M.** and Goldenberg, A. A. Fast trajectory and obstacle avoidance for autonomous robots using non-holonomic modelling. *Proceedings of the IEEE-SMC Computational Engineering in Systems Applications Conference*, Nabeul-Hammamet, Tunisia, 1998.
- Mantegh, I., **Jenkin, M.R.M.** and Goldenberg, A. A. A modular and less complex environment representation algorithm. *Proceedings of the IEEE International Symposium on Industrial Electronics (ISIE'98)*, South Africa, July, 1998.
- Klier, E.M. and Crawford, J.D. 3-D eye position is taken into account in a visuomotor reference frame transformation for saccade generation. *Conference for Research on Action and Perception*, Queens U., June, 1998.
- Regan, D. Some examples of the complementarity of psychophysical studies of neuro-ophthalmological patients and of individuals with average-to-superb visual systems. *The Neurology of Vision "New Vistas" Symposium*, Tübingen, Germany, April, 1998.
- Regan, D. Flight simulator displays: some considerations when training collision avoidance skills and when displaying textured surfaces. *Invited lecture Japanese/Canadian Workshop on Three-Dimensional Virtual Reality*. Toronto University, March, 1998.
- Regan, D. Monocular and binocular processing of time-to-collision and direction-of-motion information: relevance to highway safety. *Inter-university Eye Institute, Academic Hospital*, University of Amsterdam, April, 1998.
- Czarny, R. and **Rivest, J.** Le stéréotype: Les femmes sont plus empathiques que les hommes » existe encore, du moins implicitement. *Conférence: Société Québécoise de recherche en psychologie*, Sherbrooke, Québec, 1998.
- Rivest, J., Intriligator, J., Warner, J. and Suzuki, S. Color and luminance combine at a common neural site for shape distortions. *International Conference on Vision and Action*, York University, June, 1997.
- Smith, M.A. and Crawford, J.D. Simulating a 3-D VOR in non-orthogonal coordinate systems. *Conference for Research on Action and Perception*, Queen's U., June, 1998.
- Thompson, E. The perception of space: lived experience and cognitive science, *Tuscon III: Toward a Science of Consciousness*. University of Arizona at Tuscon, April, 1998.
- Wilcox, L.M. and Hess, R.F. When stereopsis does not depend on contrast. *European Conference on Visual Perception*, Helsinki, August, 1997.

### Colloquia

**Laurence Harris**

Kenneth Craik Club, University of Cambridge, Cambridge, UK, Sept. 16, 1997

Dept. Psychology, University d'Montreal, Quebec, Oct. 10, 1997

Dept. Psychology, McMaster University, Hamilton, Ontario, Mar. 17, 1998

**Hiroshi Ono**

Chukyo University, November 1997

University of Kyushu, November 1997

NHK laboratory, December 1997

**Martin Steinbach**

Hospital for Sick Children, Ophthalmology Rounds, April, 1998

Eye Research Institute of Canada, June, 1998

**Evan Thompson**

Carelton University, Ottawa, Nov. 21, 1997

University of Windsor, Windsor, Feb. 6, 1998

State University of New York at Buffalo, Feb. 24, 1998

Canisius College, Buffalo, Feb. 25, 1998

Indiana University, April 6, 1998

**Colloquia cont'd.****Laurie Wilcox**

Department of Psychology, University of Toronto, February, 1998

Department of Neuroscience, University of Pennsylvania, March, 1998

Invited Symposium on Applied Vision at the Annual Brain, Behaviour and Cognitive Sciences Conference,  
Ottawa, June, 1998

Department of Optometry, University of Glasgow, August, 1998

**Collaborative Research****Doug Crawford**

Dr. Douglas Tweed, Dept. Physiology, U. Western Ont., Dept. Neurology, U. Tubingen. Three dimensional geometry of eye movements.

Dr. Tutis Vilis, Dept. Physiology, U. Western Ontario. Neurophysiology of eye movements.

Dr. Daniel Guitton, Montreal Neurological Institute. Eye-head coordination during gaze shifts.

**James Elder**

Dr. Greg Dudek, Dept. of Computer Science, McGill University. Contour-based image compression.

Dr. James Clark, Dept. of Electrical Engineering, McGill University. Visual attention and virtual reality.

Dr. John Tsotsos, Dept. of Computer Science, University of Toronto. Visual attention and virtual reality.

Dr. Robert Hess, Dept. of Ophthalmology, McGill University. Psychophysics of stereopsis and blur.

**Laurence Harris**

Dr. Conrad Wall, MIT.

Dr. Andy Smith, Royal Holloway, London.

**Ian P. Howard**

Dr. Ron Kruk, CAE. Visual factors in flight simulators.  
 Dr. C. Oman, MIT. Space shuttle Neurolab mission.  
 Dr. B. Cheung, DCIEM. Orientation in flight simulators.  
 Dr. Lochlan Magee. DCIEM. Effect of noise in stereoscopic systems.  
 Dr. B. Rogers, Oxford University.

**Michael Jenkin**

Dr. G. Dudek, Dept. of Computer Science, McGill University.  
 Dr. D. Wilkes, Ontario Hydro Technologies. Swarm robotics.

**Evangelos Milios**

Dr. G. Dudek, Dept. of Computer Science, McGill University.  
 Dr. D. Wilkes, Ontario Hydro Technologies. Swarm robotics.  
 Dr. E. Prassler, FAW, University of Ulm, Germany. Dynamic mobile robot navigation system.  
 Dr. J. Tsotsos, Dept. of Computer Science, Univ. of Toronto. Architectures for auditory attention.

**Hiroshi Ono**

Dr. H. Kaneko, ATR Human Information Processing Laboratories, Kyoto, Japan.  
 Dr. S. Ohtsuka, NTT Human Interface Laboratories, Kanagawa, Japan.  
 Drs. Nicholas Wade and Michael Swanston, University of Dundee on visual motion and orientation.

**David Regan**

Dr. R. Kruk of CAE. Visual factors in aviation and flight simulator design.  
 Dr. L. Reid, Institute of Aerospace Science, University of Toronto. Flight simulators.

**Martin Steinbach**

Drs. B. Gallie, S. Kraft and N. Mungan, Hospital for Sick Children.  
 Dr. Y. Yucel, Ophthalmology U. of T.  
 Dr. Iain Donaldson, University of Edinburgh.

**Collaborative Research cont'd.****Laurie Wilcox**

Dr. D. Knill, University of Pennsylvania, Philadelphia.  
 Dr. D. Smith and Catherine Day, Toronto Hospital for Sick Children.  
 Drs. C. Baker and R. Hess, McGill University, Montreal.

**Awards and Honours****Doug Crawford**

MRC Scholar  
 Alfred P. Sloan Fellow

**David Regan**

Invited by PAGSE (Royal Society of Canada plus 22 scientific societies) to address an invited audience of politicians, bureaucrats and scientists on the theme of "Economic Benefits to Canada of Research in Science and Technology: Dr. Regan was the only scientist speaking. Title: "Invention, advice and making sure that the country that pays the bill collects the reward". Talk reprinted in full in York Faculty of Arts Newsletter. Over 80 copies requested, mostly by Federal and Provincial governments.

**Martin Steinbach**

Listing in Canada's Who's Who  
5th Annual Emerson Woodruff Lecturer, University of Waterloo

**Laurie Wilcox**

NSERC Women's Faculty Award, five year award 1995-2000.

**International Conference**

The Centre for Vision Research is hosting an International Conference on Vision and Attention, June 22-27, 1999.

**Centre for Vision Research Lecture Series**

Bart Anderson	MIT	Layered representations of depth, lightness, and opacity
Dianne Broussard	Playfair, Uof T	Motor learning in the vestibulo-ocular reflex
Andy Clarke	Klinikum, Berlin	Vestibular adaptation during microgravity
James J. Clark	McGill	Spatial attention and saccadic eye movements
Steven Dakin	McGill	First- and second-order cues to orientation
James Elder	York U.	What is the right model for the local blurring of natural images?
Peter Hallett	U. of T.	Seeing variable stars
Denise Henriques	York U	Dynamic retinotopic coding
Eliana Klier	York U.	Eye to head transformation
Evangelos Miliou	York U	Binaural sound localization
Hiro Ono	York U.	Solution to Leonardo da Vinci's paradox by the visual system
Stephen Palmisano	York U.	Perceiving self-motion in depth
Sasha Petrov	Acad. of Sc. USSR	After images and computing gaze direction
Martin Regan	York U	Advice, invention, and reward
Hongjin Sun	York U.	Visual processing of impending collision
Dejan Todorovic	Yugoslavia	Mobile reference frames
Frans Verstraten	Utrecht, Holland	The role of attention in perceiving motion