

## Director's Message

Our mandate is to pursue interdisciplinary research and training in the broadly-defined visual sciences and their applications. The sense of vision does not stand alone: it is the primary input not only for understanding the world around us, but also for guiding action in the world, for determining interaction with the world and inherently integrates with the other sensory processes. The CVR provides a simple and effective infrastructure that provides members with maximal freedom in pursuing their research programmes while encouraging collaboration among members and across disciplines.

This has been a year of exciting developments. New CVR members include:

Lauren Sergio has joined The Dept. of Kinesiology and Health Sciences from the University of Montreal; Fran Wilkinson, formerly of McGill University, has joined the Dept. of Psychology Atkinson College; Hugh Wilson, formerly of the University of Chicago, has joined the Dept. of Biology and is the holder of the ORDCF<sup>1</sup> Chair in Biological and Computational Vision; Scott Adler of the Systems Neurobiology Laboratory at the Salk Institute for Biological Studies will join the Dept. of Psychology in September and Rob Allison, previously a Research Associate of the CVR, is joining the Dept. of Computer Science. I, formerly of the University of Toronto, have joined the Dept. of Computer Science and have taken over the Directorship of the Centre as of January 1, 2000. Our new Adjunct Member Programme has attracted four excellent people already, Allison Sekuler, Patrick Bennett and Sven Dickinson, all of the University of Toronto and Pierre Jolicoeur of the University of Waterloo.

Several CVR members have received important awards this year. David M. Regan, has been awarded the highest prize given by the Association for Research in Vision and Ophthalmology, the Proctor Prize. He was also awarded the Spinoza Chair for 1999 by the Faculty of Medicine, University of Amsterdam and has also been elected as a foreign member to the Science Division the Royal Netherlands Academy of Arts and Sciences. Doug Crawford has been awarded the Premier's Research Excellence Award and Martin Steinbach has been awarded a York University Distinguished Research Professorship.

Laurence Harris led a successful application effort that resulted in the Centre being awarded an ORDCF grant. This grant provided for a senior academic position in Vision Science and as a result, Hugh Wilson was appointed to a Professorship in Biology and Frances Wilkinson to a Professorship in Psychology Atkinson College.

Also thanks to Laurence Harris, the Centre was awarded a 3-year CFI<sup>2</sup> grant for a total of \$5,939,288. This is being used to establish and equip a home for the Centre in the new Computer Science Building, and undertake a number of needed laboratory renovations in existing laboratories. The CVR will for the first time have significant space of its own for most of its members and their labs.

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<sup>1</sup> Ontario Research and Development Challenge Fund

<sup>2</sup> Canadian Foundation for Innovation

**Director's Message cont'd.**

And more changes are in the works! A new training program in Biological and Computational Visual Science has been proposed. Ph.D students successfully completing the program will receive a degree from their home department plus a Diploma in Biological and Computational Visual Sciences. Postdoctoral fellows successfully completing the program will receive a Postdoctoral Diploma in Biological and Computational Visual Sciences. We wish to expand and enhance our existing graduate student and postdoctoral training program by providing supplements to the currently available degree programs. We encourage the integration of theoretical with biological sciences; it is our firm belief that the most effective means to this end is to bring together scientists from all the relevant disciplines with the goal of providing the broadest possible training experience for qualified students in the visual sciences. All Diploma candidates will be required to demonstrate significant interdisciplinary abilities as formal requirements. Keep checking our web site [www.cvr.yorku.ca](http://www.cvr.yorku.ca) for further announcements.

Finally, I cannot end this message without thanking Ian Howard, the previous Director of the CVR. His contributions to the CVR and to vision science are enormous. He is a gentleman and a scholar; those are very big shoes that I have to fill. On behalf of the CVR, please accept our gratitude and warmest wishes for the future, Ian!

John K. Tsotsos

## Members

- Doug Crawford Associate Professor of Psychology, Biology, and Kinesiology & Health Sciences  
MRC Scholar  
Interests: three-dimensional eye and head movements, eye-hand coordination, modeling, visuomotor neurophysiology
- James Elder Assistant Professor of Psychology, Computer Science and Mathematics  
Project Leader, Human Performance Laboratory  
Interests: visual psychophysics, computational vision and visual telepresence
- Keith Grasse Associate Professor of Psychology and Biology  
Project Leader, Human Performance Laboratory  
Interests: neurophysiology of the visual system, eye movements, auditory neurophysiology, neuropharmacology (currently on leave)
- Laurence Harris Professor of Psychology and Biology  
Project Leader, Human Performance Laboratory  
Interests: neurophysiology and perception of visual, vestibular and oculomotor systems
- Ian Howard Distinguished Research Professor of Psychology and Biology  
Co-Director, Human Performance Laboratory  
Interests: space perception, eye movements, visual-vestibular interactions
- Michael Jenkin Professor and Chair of Computer Science  
Project Leader, Human Performance Laboratory  
Interests: computer vision, robotics and image understanding
- Evangelos E. Milios Associate Professor of Computer Science  
Interests: computer vision, computational auditory scene analysis, human-computer interaction. (currently on leave)
- Hiroshi Ono Professor of Psychology  
Interests: visual perception of direction and distance, eye movements
- 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  
Foreign Fellow of the Royal Netherlands Academy of Science  
Interests: psychophysics of spatial vision, motion, stereopsis, colour vision; vision aviation; visually evoked magnetic and electrical brain activity; visual disorders; auditory psychophysics

**Members cont'd.**

- Josée Rivest Associate Professor of Psychology, Glendon College, York University  
Department of Psychology of the Baycrest Centre for Geriatric Care  
Interests: neuropsychology, object recognition, multiple attributes in visual processing
- Lauren Sergio Assistant Professor of Kinesiology  
Interests: neural mechanisms of visually guided reaching in parietal and precentral cortex
- Minas Spetsakis Associate Professor of Computer Science  
Interests: computer vision and robotics
- Paul Stager Professor of Psychology  
Research Associate, Human Performance Laboratory  
Interests: human engineering in aerospace performance and system design
- Martin Steinbach Distinguished Research Professor of Psychology and Biology  
Director, Vision Science Research, Toronto Western Hospital  
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.
- Wolfgang Stuerzlinger Assistant Professor of Computer Science  
Interests: human-computer interaction, virtual reality, computer graphics
- Evan Thompson Associate Professor of Philosophy  
Interests: philosophical foundations of cognitive science and perception
- John Tsotsos Professor of Computer Science and Director of the Centre for Vision Research  
Associate Professor, Dept. of Medicine (Cardiology), University of Toronto  
Adjunct Professor, Dept. of Computer Science, University of Toronto  
Professor, Dept. of Ophthalmology, University of Toronto  
Visiting Scientist, Centre for Advanced Studies, IBM Canada (Toronto Labs)  
Interests: human and machine vision, computational models of attention, visual motion understanding, robotics
- Laurie Wilcox Assistant Professor of Psychology  
Interests: stereopsis/depth perception

### **New Members Joining CVR in 2000/01**

- Scott Adler Assistant Professor of Psychology  
Interests: the relation between cognitive and visual processes in young infants

- Rob Allison           Assistant Professor of Computer Science  
 Research Associate, Human Performance Laboratory  
 Interests: stereoscopic vision, perceptual issues in virtual environments, eye movements
- Frances Wilkinson    Professor of Psychology, Atkinson  
 Interests: involvement of the visual system in migraine. Intermediate visual form perception using psychophysical, computational and fMRI methodologies
- Hugh Wilson           ORDCF Professor of Biology  
 Interests: psychophysical and neural models of form vision, fMRI studies of cortical form vision, nonlinear dynamics of cortical function

### **Adjunct Members Joining CVR in 2000/01**

Allision Sekuler, Dept. of Psychology, University of Toronto  
 Pat Bennett, Dept. of Psychology, University of Toronto  
 Sven Dickinson, Dept. of Computer Science, University of Toronto  
 Pierre Jolicouer, Dept. of Psychology, University of Waterloo

### **Affiliate Members**

#### **Visiting Scientists 1999-2000**

Dr. Kwonsaeng Park       Department of Psychology, Keimyung University  
 Dr. Brian Rogers         Oxford University, U.K.  
 Dr. N. Wade             Dundee University, Scotland  
 Dr. Catina Feresin        University of Trieste  
 Dr. Valentine Silakov     Newington VA Medical Center

#### **Research Associates**

Dr. Bob Cheung            With I.P. Howard  
 Mr. Konstantinos Derpanis   With J. Tsotsos  
 Ms. Xueping Fang         With I.P. Howard  
 Dr. Esther Gonzalez       With M. Steinbach  
 Dr. Xiang-Hua Hong        With D. Regan  
 Ms. Linda Lillakas         With H. Ono/M. Steinbach  
 Mr. Al Mapp                With H. Ono  
 Dr. Elizabeth Irving        With M. Steinbach  
 Ms. Caroline Pantofaru     With J. Tsotsos  
 Dr. Marian Regan          With D. Regan  
 Mr. Douglas Topalovic     With J. Tsotsos  
 Mr. Iannis Tourlakis      With J. Tsotsos  
 Dr. Hongying Wang         With D. Crawford

#### **Research Associates cont'd.**

Mr. Gregory Wu            With J. Elder  
 Ms. Marie-Anne Violet     With J. Tsotsos  
 Mr. Yongjian Ye          With J. Tsotsos  
 Mr. Jim Zacher            With I.P. Howard

**Post Doctoral Fellows**

Dr. Robert Allison	With Howard/Jenkin
Dr. Florin Cutzu	With J. Tsotsos
Dr. Phil Duke	With L. Wilcox
Dr. Yuquin Hou	With J. Elder
Dr. Heather Jenkin	With I.P. Howard
Dr. Stephen Palmisano	With I.P. Howard
Dr. Robert Reeves	With J. Elder
Dr. Filippo Speranza	With L. Wilcox
Dr. Manickam Umasuthan	With J. Elder

**Graduate students****Supervisors**

Vadim Berestetsky	IBM-Congese 2 <sup>nd</sup> year M.Sc. at UofT	Tsotsos
Melike Ceylan	1 <sup>st</sup> year Ph.D.	Crawford
Alina Constantin	2 <sup>nd</sup> year M.Sc.	Crawford
Sean Culhane	6 <sup>th</sup> year Ph.D. at U ofT	Tsotsos
Bogdan Dumitrescu	2 <sup>nd</sup> year M.Sc.	Stuerzlinger
Michael Goesele	Dipl.-Inf.	Stuerzlinger
Philip Grove	2 <sup>nd</sup> year Ph.D.	Ono
Lorraine Gunther	3 <sup>rd</sup> year Ph.D.	Ono
Yoela Harris	leave of absence	Wilcox
Denise Henriques	3 <sup>rd</sup> year Ph.D.	Crawford
Elke Hergenroether	visiting Ph.D.	Stuerzlinger
Gang Hu	Obtained M.Sc.	Howard
Michelle Hudoba	Obtained M.A.	Harris
Donna Jolic	2 <sup>nd</sup> year M.A.	Rivest
Bill Kapralos	2 <sup>nd</sup> year M.Sc.	Jenkin
Radha Kohly	1 <sup>st</sup> year Ph.D.	Regan
Slava Konovalova	2 <sup>nd</sup> year M.A.	Wilcox
Agnieszka Kopinska	2 <sup>nd</sup> year Ph.D.	Harris
Eliana Klier	2 <sup>nd</sup> year Ph.D.	Crawford
Dimitrios Llianos	2 <sup>nd</sup> year M.Sc.	Crawford
S. Lee	2 <sup>nd</sup> year M.A.	D. Regan
Lewis Lo	3 <sup>rd</sup> year M.Sc.	Ostroff
Raymond Mak	IBM-Congese 2 <sup>nd</sup> year M.Sc. at UofT	Tsotsos
Iraj Mantegh	Obtained Ph.D.	Jenkin
Nathan Mekuz	IBM-Congese 2 <sup>nd</sup> year M.Sc. at UWOT	Tsotsos
Gilles Pouliquen	1 <sup>st</sup> year Ph.D.	Stuerzlinger
Fara Redlick	Obtained M.A.	Harris/Jenkin
Greg Reid	Obtained M.Sc.	Milios

**Graduate students****Supervisors**

Arlene Ripsman	2 <sup>nd</sup> year M.Sc.	Jenkin
Albert Rothenstein	IBM-Congese 2 <sup>nd</sup> year M.Sc. at UofT	Tsotsos
Tanya Ruppell	3 <sup>rd</sup> year M.Sc. at UofT	Tsotsos
Adam Sachs	2 <sup>nd</sup> year M.Sc.	Elder
Tim Salzman	2 <sup>nd</sup> year M.Sc.	Stuerzlinger
Graham Smith	2 <sup>nd</sup> year M.Sc.	Stuerzlinger

Michael Smith	3 <sup>rd</sup> year Ph.D.	Crawford
Jennifer Steeves	3 <sup>rd</sup> year Ph.D.	Steinbach
Diana Tajik	3 <sup>rd</sup> year M.A.	Steinbach
Liliana Velisavljevic	2 <sup>nd</sup> year Ph.D.	Elder
Jennifer Warner	3 <sup>rd</sup> year M.A.	Rivest
Jeffrey Zhifeng Wei	2 <sup>nd</sup> year M.Sc.	Stuerzlinger
Dan Zikovitz	2 <sup>nd</sup> year Ph.D.	Harris/Jenkin

### **Students Arriving September 2000**

Joe Amati	1 <sup>st</sup> year M.A.	Elder
Sandra Polifroni	1 <sup>st</sup> year Ph.D.	Elder
Yongqiang Cao	1 <sup>st</sup> year M.Sc.	Elder
Peta Bayley	1 <sup>st</sup> year Ph.D.	Wilcox
Kevin Hansen	1 <sup>st</sup> year M.A.	Rivest
Aarlenne Khan	1 <sup>st</sup> year M.A.	Crawford
Kevin MacKenzie	1 <sup>st</sup> year M.A.	Wilcox
Nobuko Takeuchi	1 <sup>st</sup> year M.A.	Ono

### **Honours, Awards and External Committees**

#### **Allison**

NSERC Post-Doctoral Fellowship  
1999 McDonnell-Pew Visiting Fellowship, Oxford University

#### **Crawford**

Premier's Research Excellence Award  
MRC Scholarship  
Dean's Award for Outstanding Research

#### **Regan**

Proctor Medal, Association for Research in Vision and Ophthalmology  
Editorial Board: *Vision Research; Spatial Vision; Ophthalmic and Physiological Optics.*

#### **Sergio**

Junior Faculty Research Award, York University

#### **Steinbach**

President, Vision Health Research Council of Canada  
Distinguished Research Professor, York University

### **Honours, Awards and External Committees cont'd.**

#### **Stuerzlinger**

Junior Faculty Research Award, York University

#### **Tsotsos**

Journal Editorial Board Member: *Image and Vision Computing Journal*, North American Editor;  
*Computer Vision and Image Understanding*, Area Editor; *Computational Intelligence*, Associate Editor.  
General Chairman: 7th IEEE International Conference on Computer Vision, September 1999.

Program Committee Member: Workshop on Integration of Speech and Image Understanding, Sept, 1999; Vision Interface 2000, Montreal; International Conference on Pattern Recognition, Sept., 2000; IEEE International Workshop on Biologically-Motivated Computer Vision, May, 2000. Committee Member: IEEE PAMI-TC, Conference Steering Committee, 2000 – 03; IRIS Research Management Committee, 2000 – 01; CITO Machine Vision Thrust Review Committee, 2000.

**Wilcox**

Faculty of Arts TML/TEL award (2000/2001) - Teaching release fellowship to support development of a web-based course.

**E. Lynn Kirshner Memorial Scholarship for 1999**

The 1999 Kirshner Award for best senior-authored paper by a graduate student in vision Science was shared between:

**Phil Grove** for his senior author paper, "Ecologically invalid monocular texture leads to longer perceptual latencies in random-dot stereograms", P.H. Grove and H. Ono, *Perception*, Volume 28, 627-639 (1999).

**Jennifer Steeves** won the award for her senior author paper "Monocular horizontal OKN in observers with early- and late-onset strabismus", J.K.E. Steeves, M.J. Reed, M.J. Steinbach, and S.P. Kraft, *Behavioural Brain Research*, Volume 103, p 135-143 (1999).

## Research Grants (Annual for 1999/2000)

Ontario Centre of Excellence Grant - Elder, Harris, Howard, Jenkin, Ono and Regan, Human Performance Laboratory	550,000
Ontario Research and Development Challenge Fund (ORDCF)	76,000
Canadian Foundation for Innovation (CFI)	1,979,763
<b>Crawford</b>	
MRC Grant with M. Goodale, T. Vilis, D. Tweed, R. Menon	502,230
MRC Operating Grant. Brainstem control of 3-D eye and head movements	88,440
MRC Scholarship. Neural control of 3-D eye and head movements	59,000
NSERC Operating Grant. Spatial representations for perception and motor control	30,000
NSERC Equipment Grant.	37,000
<b>Elder</b>	
IRIS Research Grant, with J. Clark, and J. Tsotsos	100,000
GEOIDE Grant, with D. Clausi, G. Edward and F. Ferrie	185,000
NSERC Operating Grant	28,500
CFI New Opportunities Grant with L. Wilcox	454,500
<b>Grasse</b>	
NSERC Operating Grant	32,340
<b>Harris</b>	
NSERC Operating Grant. The detection of conflict in visual-vestibular interactions	33,500
NSERC Collaborative Research Grant, with M. Jenkin	68,000
<b>Howard</b>	
NSERC Operating Grant. Spatio-temporal disparity detection and vergence	45,000
NSBRI Grant. Visual orientation in unfamiliar gravito-inertial environments	70,840
DCIEM Contract. Post-rotary effects on attitude perception during rolling manoeuvre	78,000
<b>Jenkin</b>	
NSERC Operating Grant. Embedded stereo vision	25,300
NCE Grant	16,000
CITO Grant. Cognitive Robotics with Y. Lesperance	75,000
<b>Ono</b>	
NSERC Operating Grant. Sensory and motor aspects of space perception	35,230
ATR Human Information Processing Laboratories. Vertical disparity and visual direction	14,400
<b>Regan</b>	
NSERC/CAE Industrial Chair	90,000
NSERC Operating Grant	73,000
AFOSR Grant	219,830
<b>Rivest</b>	
NSERC Operating Grant. The role of attention on processing multiple attributes images	18,000
<b>Sergio</b>	
Faculty of Arts grant. Start-up funds	53,500
Faculty of Arts grant. Junior faculty award	2,500
NSERC Operating Grant	10,000
<b>Steinbach</b>	
NSERC Operating Grant. Human oculomotor control	38,000
<b>Stuerzlinger</b>	
NSERC Operating Grant	14,700
MFA Grant with Jenkin, Tsotsos, et. al.	91,000
<b>Evan Thompson</b>	
SSHRC Standard Research Grant	28,920
McDonnell Fellowship in Philosophy and the Neurosciences	40,000
Research Grant, Center for Consciousness Studies, University of Arizona at Tucson	17,500
<b>Tsotsos</b>	
CRESTech. Visual Attention and Applications with J. Elder	10,000
NSERC Operating Grant. Computational Models of Visual Attention	72,000
IRIS - Phase 3. Visual Attention and Applications, with J. Elder, J. Clark	12,000
IRIS - Phase 3. Active Visual Behaviors for Remote Robotic Perceptual Systems, with M. Jenkin, A. Jepson	150,000
IBM. Face and Gesture Recognition	25,000
CITO Grant. Eyes'n ears with M. Jenkin and E. Milios	25,000
<b>Wilcox</b>	
NSERC Operating Grant	24,000
IMAX Corporation research funding	62,000
IMAX Funding	75,000
<b>TOTAL</b>	<b>5,735,993</b>

## Publications 1999/2000

## Books

- Dudek, G. and Jenkin, M. (2000) *Computational Principles of Mobile Robotics*. Cambridge University Press, pp 294.
- Jenkin, M. and Harris, L.R. (2000) *Vision and Attention*. New York, Springer-Verlag, in press.
- Regan, D. (2000) Human Perception of Objects: Early Visual Processing of Spatial Form Defined by Luminance, Color, Texture, Motion and Binocular Disparity. Sunderland MA: Sinauer, pp 607.

## Chapters in Books

- Harris L.R. and Jenkin, M. (2000) Vision and attention. In M. Jenkin and L.R. Harris (Eds.) *Vision and Attention*. (Eds.) New York, Springer-Verlag, in press.
- Howard, I.P. (2000) The fidelity of disparity-based stereopsis in helmet-mounted displays. In L.Hettinger (Ed.) *Virtual Reality Systems*. Elsevier, in press.
- Regan, D. and Kohly, R.P. (2000) A family of long-distance interactions. In L. Harris and M. Jenkin (Eds.) *Vision and Attention*, New York, Springer-Verlag, in press.
- Regan, D. (2000) Early Visual processing of spatial form. In P. Semple (Ed.) *Adler's Physiology of the Visual System*, in press.
- Regan, M.P. and Regan, D. (2000) Techniques for investigating and exploiting nonlinearities in brain responses evoked by sensory stimuli. In Z.L. Lu, G. Sperling and L. Kaufman (Eds.) *Magnetic Source Imaging of the Human Brain*, in press.
- Stager, P. (2000) Achieving the objectives of certification through validation: Methodological issues. In J. Wise and V.D. Hopkin (Eds.) *Human Factors in Certification*, Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 91-103. (Part of the "Human Factors in Transportation Series")
- Steinbach, M.J. (2000) The palisade ending: An afferent source for eye position information in humans. In G. Lennerstrand, J. Ygge, T. Laurent (Eds.) *Advances In Strabismus Research: Basic and Clinical Aspects*, London, Portland Press, in press.
- Thompson, E. (2000) Comparative colour vision: Quality space and visual ecology. In Brian Funt (Ed.), *Colour Perception*. Vancouver Studies in Cognitive Science. Oxford University Press, in press.
- Thompson, E., No', A. and Pessoa, L. (2000) Filling In: Visual science and the phenomenology of perception. 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.
- Tsotsos, J.K. (2000) Complexity, vision and attention. In L. Harris and M. Jenkin (Eds.) *Visual Attention*, Cambridge University Press, in press.
- Tsotsos, J.K., Culhane, S., Cutzu, F. (2000) From theoretical foundations to a hierarchical circuit for selective attention. In J. Braun and C. Koch (Eds.) *Visual Attention and Cortical Circuits*, MIT Press, in press.
- Ye, Y., Tsotsos, J.K. (1999) Knowledge granularity spectrum, action pyramid, and the scaling problem. In Jiming Liu and Ning Zhong (Eds.) *Intelligent Agent Technology, Systems, Methodologies, and Tools*, World Scientific, pp 152-161.
- Ye, Y., Tsotsos J.K. (2000) On the collaborative object search team: a formulation. In G. Weiss (Ed.) *Learning in DAI Systems*, Springer-Verlag LNCS/LNAI Proceedings, in press.
- Zikovitz, D.C. and Harris, L.R. (2000) Effects of gravito-inertial-force and vision on head tilt during driving. In A. Gale (Ed.) *Vision in Vehicles VII*, Elsevier North-Holland, pp. 281-288.

## Papers in Refereed Journals

- Allison, R.S. and Howard, I.P. (2000) Depth perception with persisting and dynamic textures. *Vision Research*, in press.
- Allison, R.S., Howard, I.P. and Fang, X. (2000) Depth selectivity of vertical fusional mechanisms. *Vision Research*, in press.
- Allison, R.S. and Howard, I.P. (2000) Temporal dependencies in resolving monocular and binocular cue conflict in slant perception. *Vision Research*, 40, 1869-1886.
- Crawford, J.D. (2000) Task-dependent constraints in motor control: pin-hole goggles make the head move like an eye. *Journal of Neuroscience*, 20, 2719-2730.
- Crawford, J.D., Henriques, D.Y.P. and Vilis, T. (2000) Curvature of visual space under vertical eye rotation: implications for spatial vision and visuomotor control. *Journal of Neuroscience*, 20, 2360-2368.
- Crawford, J.D., Ceylan, M.Z., Klier, E.M. and Guitton, D. (1999) Three-dimensional eye-head coordination during gaze saccades in the primate. *Journal of Neurophysiology*, 81, 1760-1782.
- Dickinson, S., Wilkes, D. and Tsotsos, J. (1999) A computational model of view degeneracy. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 21-8, 673-689.
- Dudek, G., Jenkin, M. and Milios, E. (2000) Perception for mobile agents. *Autonomous Robots*, 8, 03-104, Special Issue on Perception for Mobile Agents, G. Dudek, M. Jenkin and E. Milios (Eds.).
- Elder, J.H. (1999) Are edges incomplete? *International Journal of Computer Vision*, 34, 97-122.
- Gonzalez, E., Steinbach, M. J., Ono, H. and Gallie, B.L. (1999) Localization of facial landmarks in binocular and monocular children. *Binocular Vision*, 14, 127-136.
- Gray, R. and Regan, D. (1999) Motion in depth: adequate and inadequate simulation. *Perception and Psychophysics*, 61, 236-245.
- Gray, R. and Regan, D. (2000) Estimating time to collision with a rotating nonspherical object. *Vision Research*, 40, 49-63.
- Gray, R. and Regan, D. (1999) Do monocular time to collision estimates necessarily involve perceived distance? *Perception*, 28, 1257-1264.
- Harris, L.R and Smith, A.T. (2000) Second order motion influences OKN to first order motion. *Experimental Brain Research*, 130, 67-72.
- Harris, L.R., Jenkin, M. and Zikovitz, D.C. (2000) Vestibular capture of the perceived distance of passive linear self motion. *Archives Italiennes de Biologie*, 138, 63-72.
- Harris, L., Jenkin, M. and Zikovitz, D. (2000) Visual and non-visual cues in the perception of linear self motion. *Experimental Brain Research*, in press.
- Henriques, D.Y.P. and Crawford, J.D. (2000) Direction-dependent distortions of retinocentric space in the visuomotor transformation for pointing. *Experimental Brain Research*, 132, 179-194.
- Howard, I.P., Fang, X. and Allison, R.S. (2000) Effects of stimulus size and eccentricity on horizontal vergence. *Experimental Brain Research*, 130, 124-132.
- Howard, I.P. (1999) The Helmholtz-Hering debate in retrospect. *Perception*, 28, 543-549.
- Howard, I.P. and Jenkin, H.L. and Hu, G. (2000) Visually induced reorientation illusions as a function of age. *Aviation, Space and Environmental Medicine*, 71, 1-5.
- Irving, E. L., Goltz, H.C., Steinbach, M.J. and Kraft, S.P. (1999) Reply to Letter to the Editor: Vertical latent nystagmus component and vertical saccadic asymmetries in subjects with dissociated vertical deviation. *Journal of the American Association for Pediatric Ophthalmology and Strabismus*, 3, 257-258.
- Kohly, R. and Regan, D. (1999) Evidence for a mechanism sensitive to the speed of cyclopean form. *Vision Research*, 39, 1011-1024.
- Lang, J. and Jenkin, M.R.M. (2000) Active modeling with VIRTUE. *Autonomous Robots*, 8, 141-159. Special issue on Perception for Mobile Agents, G. Dudek, M. Jenkin and E. Milios (Eds.)

**Papers in Refereed Journals cont'd.**

- Ono, H., Shimono, K., Saida, S. and Ujike, H. (2000) Transformation of visual line in binocular vision: Stimuli on corresponding points can be seen in two different directions. *Perception*, 29, 421-436.
- Palmisano, S.A., Allison, R.S. and Howard, I.P. (2000) What is the problem with binocular correspondence? *Australian Journal of Psychology*, in press.
- Regan, D. and Gray, R. (1999) Hand-eye coordination: Visual aspects. *Trends in Cognitive Science*, in press.
- Saida, S., Ono, H. and Mapp, A.P. Closed-loop and open-loop accommodative vergence eye movements. *Vision Research*, in press.
- Sakurai, K. and Ono, H. (2000) Depth perception, motion perception and their trade-off while viewing stimulus motion yoked to head movement. *Japanese Psychological Research*, 42(4), 230-236.
- Steeves, J., Reed, M.J., Steinbach, M.J. and Kraft, S.P. (1999) Monocular horizontal optokinetic nystagmus in observers with early- and late-onset strabismus. *Behavioural Brain Research*, 103, 135-143.
- Steeves, J.K.E., Gray, R., Steinbach, M.J. and Regan, D. (2000) Accuracy of estimating time to collision using only monocular information in unilaterally enucleated observers and monocularly viewing normal controls. *Vision Research*, in press.
- Steinbach, M.J. (2000) Public Health Task Force for Vision and Ophthalmology. Determining the information needs for prevention of vision loss strategies in Canada. *Canadian Journal of Ophthalmology*, in press, (M.J. Steinbach one of 19 authors).
- Thompson, E. and Varela, F.J. (2000) Autopoiesis and Lifelines: The importance of origins, open peer commentary on Steven Rose, *Precis of lifelines: Biology beyond determinism. Behavioral and Brain Sciences*, 23.
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### **Presentations at Conferences**

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- Elder, J.H. Perceptual factors in virtual reality and telepresence. *PRECARN-IRIS IX Annual Conference*, Toronto, Canada, 1999.
- Freedman, E.G., Crawford, J.D., Van Opstal, J. and Corneil, B. Current directions in head-free gaze control: the superior colliculus and beyond. *Neural Control of Movement Conference*, Key West, Florida, April 9-14, 2000.
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- Prud'Homme M., Messier J., Brochier T., Sergio L., Kalaska J.F., Gosselin-Kessiby N. and Bouthillier M. Performance sensorimotrice de sujets contrôles et de sujets pariétolesés [Sensory-motor performance of control and parietal-lesioned subjects]. *Canadian Congress of Neurological Sciences*, Ottawa, June, 2000.
- Thompson, E. Beyond the first-person singular: Intersubjectivity and phenomenological reflection. Tucson 2000: Toward a science of consciousness. *The Plenary Session on First-Person Methodologies*, Tucson, Arizona. April 10, 2000.
- Thompson, E. The intersubjectivity of human consciousness: Phenomenology and cognitive science. Keynote Address. *Conference on Human Consciousness: Integrating Phenomenology and Cognitive Science*, The Fetzer Institute, Kalamazoo, Michigan, September 24, 1999.
- Thompson, E. The nonduality of self and other: Steps from cognitive science to a science of interbeing. *Conference on Globalizing Philosophy*, Columbia University, April 16-17, 1999.

### **Presentations at Conferences cont'd.**

- Tsotsos, J. Hierarchical circuits for selective attention. *Workshop on Attention*, Guenzburg, Germany, Nov. 19 - 21, 1999.
- Tsotsos, J. Computational modeling of visual attention. *The 'Jan-Olof Eklundh' Workshop*, Stockholm, Aug. 18, 1999.

### **Colloquia**

**Crawford**

Neuroscience Seminar Series, Queens University, 2000.  
 Department of Psychology, McMaster University, 2000.  
 Perspectives in Neuroscience Series, University of Western Ontario, 2000.  
 Department of Medical Physics and Biophysics, University of Nijmegen, 1999.

**Elder**

McGill University Vision Research Seminar, Montreal, 2000.  
 York University Department of Mathematics Colloquium and Applied Mathematics Seminar, 2000.  
 Dalsa Inc., Waterloo, 1999.

**Harris**

University of Tübingen, Germany, Nov. 1999.  
 Max Planck Institute for Biological Cybernetics, Tübingen, Germany, Nov. 1999  
 Dept. Biology, York University, Toronto, Canada, 2000

**Howard**

Department of Psychology, University of Melbourne, March 2000.  
 Department of Psychology, Deakin University, Australia, March 2000.  
 Defence Research Establishment, Melbourne, March 2000.  
 Department of Neuroscience, National University of Australia, Canberra, March 2000.  
 Department of Psychology, University of Sydney, April 2000.  
 Department of Psychology, University of New South Wales, Australia, April 2000.  
 Department of Neuroscience, University of Queensland, Australia, April 2000.  
 Department of Psychology, James Cook University, Australia, April 2000.

**Steinbach**

University of Montreal, School of Optometry, 2000.  
 Vision Health Research Council (vhrc.net) Talks:  
 Association for Research in Vision and Ophthalmology meeting, 1999.  
 Trois-Rivieres, Quebec. Quebec Vision Health Network. October, 1999.  
 Halifax Vision Scientists. November, 1999.  
 Hospital for Sick Children, Ophthalmology Rounds. December, 1999.  
 Parliament of Canada, Standing Committee on Health, December, 1999.  
 University of Waterloo, School of Optometry, January, 2000.  
 York University, Centre for Vision Research. January, 2000.  
 Vancouver Eye Centre, February, 2000.  
 Calgary Vision Scientists, February, 2000.

**Colloquia cont'd.****Stuerzlinger**

University of Bonn, Germany, June 2000.  
 University of Linz, Austria, July 2000.

**Tsotsos**

Fachhochschule Rhein-Sieg, Fachbereich Angewandte Informatik, Sankt Augustin, Germany, Nov. 1999.

Colloquium of the Collaborative Research Centre "Situating Artificial, Communicators" (SFB),  
University of Bielefeld, Germany, Nov. 1999.

FB Informatik, Universität Hamburg, Germany, Nov. 1999.

Bloorview MacMillan Rehabilitation Center, Toronto, Feb. 2000.

Dept. of Computer Science and Dept. of Electrical Engineering, McGill University, June, 2000.

## **Collaborative Research**

### **Crawford**

Dr. Ravi Menon, Dept. of Radiology, University of Waterloo.

Dr. Phil Servos, Dept. of Psychology, Laurier.

Dr. Mel Goodale, Dept. of Psychology, University of Waterloo.

Dr. Keith Humphrey, Dept. of Psychology, University of Waterloo.

Dr. David Waitzman, Dept. of Neurology, Newington VA Medical Centre.

Dr. Stan Gielen, Nijmegen, Holland

### **Elder**

Dr. James Clark, McGill University.

Dr. David Clausi, University of Waterloo.

Dr. Geoffrey Edwards, Laval University.

Dr. Frank Ferrie, McGill University.

Dr. James Little, University of British Columbia.

### **Harris**

Dr Conrad Wall, Jenks Vestibular Lab, MIT.

Dr Chuck Oman, Man Vehicle Lab, MIT.

Dr Michael Fetter, Neurology, Univ Tübingen.

Dr Andy Smith, Royal Holloway College, University of London.

### **Howard**

Brian Rogers, Oxford University, England.

Chuck Oman, MIT.

Bob Cheung, DCIEM.

### **Regan**

Dr. Robert Gray, Nissan Basic Vision Lab., Boston.

### **Rivest**

James Sharpe and Ji Soo Kim, Division of Neurology and Playfair Neuroscience Unit,  
University Health Network, University of Toronto.

### **Collaborative Research cont'd.**

### **Steinbach**

Dr. Sharon Abel, Mt. Sinai Hospital, Toronto.

Dr. Stephen Kraft, Hospital for Sick Children.

Dr. Brenda Gallie, Ontario Cancer Institute.

Dr. Iain Donaldson, University of Edinburgh.

Dr. Elizabeth Irving, University of Waterloo.

### **Stuerzlinger**

Dr. Pantelis Elinas, Dept. of Computer Science, UBC, Vancouver.

Dr. Stefan Mueller, Fraunhofer GmbH, Darmstadt, Germany.

Dr. Sergey Parilov, Orel University, Orel, Russia.

### **Tsotsos**

Dr. Allan Jepson, University of Toronto.

Dr. W. James MacLean, University of Toronto.

Dr. Rainer Herpers, Fachhochschule Rhein-Sieg, Fachbereich Angewandte Informatik, Sankt Augustin, Germany.

Dr. Yiming Ye, IBM TJ Watson labs, USA.

### **Wilcox**

Dr. D. Smith, Toronto Hospital for Sick Children.

Dr. G. Harris, IMAX Corporation.

Dr. Robert Hess, McGill University.

### **Conference on Vision and Attention**

The Centre for Vision Research hosted an international conference on Vision and Attention in June 1999. The next International Conference will be on Levels of Perception in June, 2001.

### **Centre for Vision Research Lecture Series**

Robert Sekuler	Brandeis	Visuo-motor imitation
Kyle Cave	Southampton, U.K.	Selecting visual information
Martin Regan	York U	Collision avoidance and collision achievement
Tutis Vilis	Western	Perceptual consequences of 3D eye rotations
Sylvain Haudegond	U of T	Visual scanning patterns in interface design
Ron Rensink	Cambridge	Attention and the perception of scenes
Kevin Brooks	Sussex	Stereoscopic vision
Marty Steinbach	York U	A Canadian Vision Health Research Institute
Terri Lewis	McMaster	Effects of early monocular vs binocular deprivation
Pieter Medendorp	Nijmegen	Gaze stabilization during head movements
Josee Rivest	Glendon, York U	A shape distortion-an effect from the ventral stream
Michael Lang	Max Planck	Reflections on colour and shadows
Mel Goodale	Waterloo	Vision and action
Toshiyuki Gotoh	Yokoham, Japan	Three dimensional image processing.
Lauren Sergio	York U	The control of visually-guided arm movements
Eric Groen	TNO, Netherland	Motion perception in a simulator
Jelte Bos	TNO, Netherlands	Gravity, internal models and motion sickness