

Proceedings  
NINTH INTERNATIONAL CONFERENCE



**PERCEPTION AND ACTION**

**July 20 – 25, 1997**  
**University of Toronto**  
**Scarborough, Ontario**

# The Ninth International Conference on Perception and Action

• *Proceedings* •

July 20-25  
University of Toronto  
Scarborough, Canada

Editors

**Gerard L. Torenvliet**  
**Kim J. Vicente**  
*University of Toronto*

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**John M. Kennedy**  
*University of Toronto*

Sponsored by

The International Society for Ecological Psychology

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*This book is dedicated to the memory of  
Edward S. Reed,  
friend and scholar.*

# Program

**Daily Schedule**

9:00 – 10:30	<i>Symposium</i>
11:00 – 12:30	<i>Symposium</i>
13:30 – 15:00	<i>Symposium</i>
15:15 – 16:45	<i>Symposium</i>
17:00 – 18:00	<i>Poster Session</i>
19:00	<i>Social Activities</i>

<b>Sunday</b>	Registration and Reception (The Meeting Place)
<b>Monday</b>	BBQ (Patio)
<b>Tuesday</b>	Dine-around (Sheraton Hotel)
<b>Wednesday</b>	No scheduled symposia; discussion at 20:00 Council Chamber: <i>Edward Reed and ecological psychology</i> Hosted by Stavros Valenti, with Bill Warren
<b>Thursday</b>	Salmon Dinner (College Dining Rooms)
<b>Friday</b>	Banquet (Sheraton Hotel)

**Notes:**

- The *Meeting Place* is the central hall of the University of Toronto at Scarborough
- The Registration desk will be open Sunday at the Reception and each day of the conference from 8:00 to 11:00. The Registration desk is situated outside the Conference Lecture Theatre, H-216, University of Toronto at Scarborough.
- The hall for Posters is H-305.

**Monday**

- 9:00 – 10:30 **Tau and its limiting factors**  
 Chairs: Heiko Hecht and Geert P.S. Savelsbergh
- Elements of general tau theory*  
 David Lee
- The utility of a temporal metric for vehicular control*  
 Mary Kaiser
- Functional correspondence in auditory object perception*  
 Thomas Schinauer
- t-coupling in the control of gaze movements*  
 Madeleine A. Grealy
- Information and action in timing the punching of a falling ball*  
 Claire F. Michaels, Edzard Zeinstra and Raoul R. D. Oudejans
- Effects of pictorial depth information on judgments of time-to-contact*  
 Patricia R. DeLucia
- Effect of background, orientation change, and viewing conditions on time-to-passage judgments*  
 Geert P. S. Savelsbergh and Heiko Hecht
- 11:00 – 12:30 **Tau and its limiting factors symposium, continued**
- 13:30 – 15:00 **Purposeful activities with objects**  
 Chairs: Jeffrey J. Lockman and Emily W. Bushnell
- Relating objects together*  
 Jeffrey J. Lockman
- Cognitive constraints in tool-use during infancy*  
 Emily W. Bushnell and J. Paul Boudreau
- Tool-using and object manipulation activities of capuchin monkeys*  
 Dorothy Fragaszy
- Knot-tying as a perception-action problem*  
 Patrick A. Cabe
- 15:15 – 16:45 **Gibson, intentionality, and the revolt against mechanism**  
 Chairs: Endre E. Kadar and Alan P. Costall
- Darwin's intentions*  
 Alan P. Costall
- Act, experience, and process: Three emerging stances toward intentionality*  
 Robert E. Shaw
- William James, E. B. Holt, and the intentionality in ecological psychology*  
 Harry Heft
- Ecological psychology and the tradition of phenomenology*  
 Endre E. Kadar

**Tuesday**

- 9:00 – 10:30 **Dynamics of movement disorders**  
*Chairs:* Richard E. A. VanEmmerik and Robert C. Wagenaar
- The dynamics of gait in cerebral palsy*  
 Kenneth G. Holt, Sergio T. Fonseca, and John P. Obusek
- Relative phase dynamics of walking in low back pain patients*  
 Onno G. Meijer, Claudine J. C. Lamoth, M. Levin, P. I. J. M. Wuisman, and Robert. C. Wagenaar
- A dynamical systems perspective on rigidity and tremor in Parkinson's disease*  
 Richard E. A. Van Emmerik and Robert C. Wagenaar
- A model of sensorimotor deficits in patients with central nervous system lesions*  
 Mindy Levin, Ruud Selles, Martine Verheul, and Onno Meijer
- Reaching and grasping strategies in hemiparetic patients*  
 Agnes Roby-Brami and Sylvie Fuchs
- The role of discovery learning and behavioral information in relearning dynamics*  
 Robert C. Wagenaar and Richard E. A. van Emmerik
- 11:00 – 12:30 Dynamics of movement disorders symposium, continued.
- 13:30 – 15:00 **The phrasing of multi-effector gestures: Theory and CHI design**  
*Chair:* Yves Guiard
- Issues in bimanual coordination: The Props-based interface for neurosurgical visualization*  
 Kenneth Hinckley
- Ecological design and bimanual interaction with computers*  
 Bill Buxton
- Left-right asymmetry: for the preferred range of movement metrics*  
 Yves Guiard
- 15:15 – 16:45 **Emerging effectivities: Intention in action**  
*Chair:* Julie C. Rutkowska *Discussant:* Harry Heft
- The parent as a systemic component of infant intentionality*  
 Dankert Vedeler
- Enacting effectivities and affordances*  
 Julie C. Rutkowska
- Teasing intentions out*  
 Vasudevi Reddy and Emma Williams
- Dimensions of expression and the organization of behaviour: Pigs in interaction*  
 Francoise Wemelsfelder
- Reserve paper:** *The 'observable subject': Making sense of animal behaviour*  
 Alan Costall and Paul Morris

**Wednesday**

- 9:00 – 10:30 **Learning, degrees of freedom, and coordination dynamics**  
*Chair:* Karl M. Newell  
*Issues in degrees of freedom and the learning of coordination dynamics*  
 Karl M. Newell  
*Reducing the degrees of freedom problem*  
 Michael P. Broderick  
*Phase space reconstruction and the learning of rhythmic motor coordinations*  
 S. Mitra  
*Learning a bimanual rhythmic coordination: Schemas as dynamics*  
 Polemnia G. Amazeen
- 11:00 – 12:30 **Dynamical modelling**  
*Chair:* Dagmar Sternad  
*Ambient information for critically timed action control in the cerebellum*  
 Daniel Bullock  
*Dynamical models of the interaction of oscillatory components in action*  
 Bruce A. Kay  
*A recurrent network for the sequencing of speech gestures*  
 Elliot Saltzman  
*"Neural" oscillators for discrete and rhythmic movements*  
 Dagmar Sternad
- 13:30 – 15:00 **Ecological design strategies for on-line assessment of situated problem-solving**  
*Chairs:* Judith A. Effken, Robert E. Shaw, and Kim J. Vicente  
*The unit of analysis for situated assessment*  
 Michael Young, Sasha Barab, and Jonna Kulikowich  
*Novel measures of adaptation and performance for complex human-machine systems*  
 Renee W. Y. Chow, Dianne E. Howie, Gregory A. Jamieson, Gerard L. Torenvliet, Xinyao Yu, and Kim J. Vicente  
*On-line assessment of situated problem-solving: Strategies and suggestions*  
 Judith A. Effken and Steven Garrett  
*Path Space Analysis: Comparing solution paths of experts and novices*  
 Anthony Morris and Robert E. Shaw
- 15:15 – 16:45 **Towards an ecology of consciousness**  
*Chair:* John Pickering  
*The importance and inadequacy of consciousness*  
 Bert H. Hodges  
*What is it like to be a baby?*  
 Alan Fogel  
*Situating ecological psychology*  
 Ivan Leudar and Alan Costall  
*Consciousness, agency, and the limits of the social*  
 Tim Ingold

## Thursday

- 9:00 – 10:30 **Proffering affordances through virtual window displays**  
*Chair:* Pieter Jan Stappers
- Experiential space/time*  
 John M. Flach
- Action during exploration*  
 Fred A. Voorhorst, Kees J. Overbeek, and Gerda J. F. Smets
- Perceptual issues in mixed reality displays*  
 Paul Milgram and David Drascic
- Distortion in on- and off-axis movement-coupled perspective displays*  
 Wouter Pasman, Pieter Jan Stappers, and Gerda J. F. Smets
- 11:00 – 12:30 **The role of direct experience in learning, memory, and education**  
*Chair:* Sverker Runeson
- Direct experience and the development of a humanoid robot*  
 Rodney A. Brooks
- On the nature and acquisition of perceptual skills*  
 Sverker Runeson, Peter Juslin, and Henrik Olsson
- Direct vs. indirect experience: A new look at media effects*  
 Robin C. Flanagan and John B. Black
- An ecological theory of expertise effects in memory recall*  
 Kim J. Vicente and Joanne H. Wang
- LUNCHTIME Business Meeting
- 13:30 – 15:00 **The development of coordination**  
*Chairs:* Eugene C. Goldfield, Paula Fitzpatrick, and Richard C. Schmidt  
*Discussant:* Elliot Saltzman
- Using dynamical methods to understand developing systems*  
 Paula Fitzpatrick and Richard Schmidt
- Sensorimotor coordination and the development of walking*  
 Jane E. Clark, John Jeka, and Jose Barela
- Coordination of infant pacifier sucking and breathing*  
 Eugene C. Goldfield and Peter H. Wolff
- Modelling the coordination of infant sucking and breathing*  
 Richard C. Schmidt, Paula Fitzpatrick, and Eugene C. Goldfield
- 15:15 – 16:45 **Social interaction with computers?**  
*Chair:* Lieselotte Van Leeuwen
- Perception & action integration in a communicative software agent*  
 Kristinn R. Thorisson
- Can a computer perceive affordances?*  
 Lieselotte van Leeuwen
- Invariants of interaction*  
 Henk J.G. de Poot
- Are computer affordances environmental or social?*  
 William W. Gaver

## Friday

- 9:00 – 10:30 **Cooperation among the senses in the perception and control of orientation**  
 Chairs: Benoît G. Bardy and Thomas A. Stoffregen  
*Visual-vestibular interactions in the perception of the body vertical*  
 Ian P. Howard  
*Multiple sources of information for the control of posture and locomotion*  
 James R. Lackner  
*Postural stabilization of vision*  
 Thomas A. Stoffregen and Jay Smart
- 11:00 – 12:30 **Finding reality: Is it virtually assured?**  
 Chairs: Geoff P. Bingham and Eric L. Amazeen  
*Intuitive physics in the design of virtual environment interfaces*  
 Pieter Jan Stappers  
*Infant sensitivity to visual trajectory forms and event recognition*  
 Emily A. Wickelgren and Geoffrey P. Bingham  
*Haptic perceptions of size and weight are independent*  
 Eric L. Amazeen  
*Object recognition potentiality of haptic virtual environment*  
 Laroussi Bouguila, Yi Cai and Makoto Sato
- LUNCHTIME Business Meeting, continued
- 13:30 – 15:00 **Spatial perception by haptic and dynamic touch**  
 Chair: Christopher C. Pagano  
*Is cutaneous touch necessary to perceive length by dynamic touch?*  
 Claudia Carello and Eric L. Amazeen  
*Haptic perception of space*  
 Astrid M.L. Kappers and Jan J. Koenderink  
*Tangible drawings of 3-D space are perceptually salient*  
 Morton A. Heller, Shavonda Green, Cindy Flynt, and Jeffrey Calcaterra
- 15:15 – 16:45 **Linear perspective in perception and action**  
 Chairs: Harold Sedgwick and Andrea Nicholls  
*Convention and constraint in pictorial perspective*  
 Sheena Rogers  
*Subtense, convergence, and foreshortening: Effects on middle obliques of cubes*  
 Andrea Nicholls and John M. Kennedy  
*Perceiving transformations of space in perspective pictures*  
 Tyrone Yang and Michael Kubovy  
*What is the effective information in linear perspective?*  
 Harold A. Sedgwick, Thomas Flagg, and Jeanette Meng